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Tropical Home Nursing

THIRTEENTH EDITION.

COLONEL R. J. BLACKHAM, C.B., D.S.O., M.D.

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December, 1921

Presented by
The Author

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TROPICAL HOME NURSING

BY

COLONEL R. J. BLACKHAM,

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PREFACE TO THIRTEENTH EDITION.

The seventh and eighth editions of this book appeared whilst I was on Active Service as head of the Medical Services with a Division and an Army Corps in France, Belgium, Italy and Russia.

A feature of the Great War was the amount of educational effort which constantly went on quite close to the front, and it may be of interest to say that this manual has been used in Schools of Instruction for medical orderlies and stretcher bearers situated a few kilometres behind the firing line.

This edition has been very carefully revised and I am much indebted to Miss Dowbiggin, R.R.C., B.E.M., Matron of the North Middlesex Hospital, for reading over the proof sheets and many valuable suggestions.

Students preparing for examinations are advised to use the book in conjunction with my Catechism of Home Nursing. During the past two years the book has been adopted as the text book for Tropical classes at the London College of Ambulance and it is hoped that this thirteenth edition may continue to merit the cordial reception which has been given to its predecessors, not only by St. John and Red Cross pupils, but by untrained persons called upon to nurse cases of illness at outposts of the Empire.

ARMY AND NAVY CLUB, PALL MALL.

R. J. BLACKHAM, M.D.,
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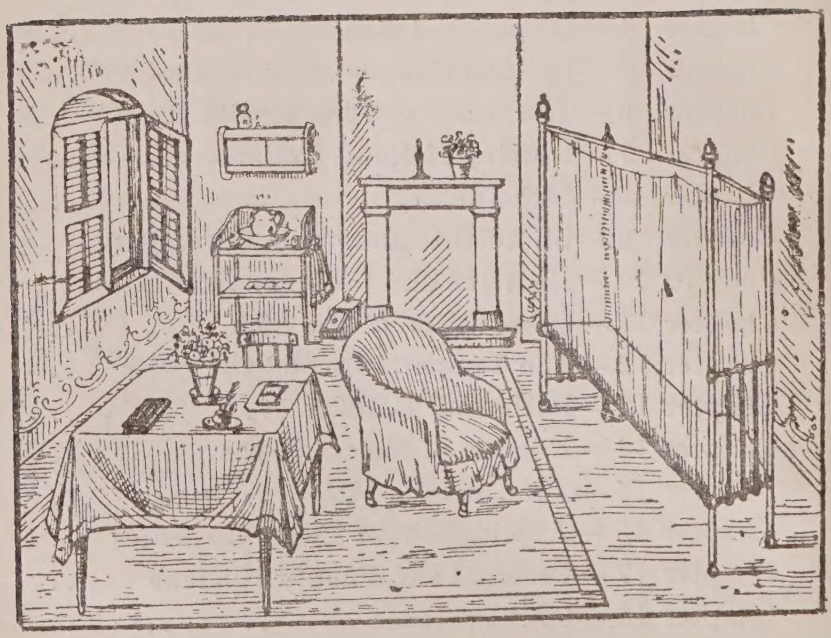

The arrangement of a Sick Room in India.

TROPICAL HOME NURSING.

CHAPTER I.

The Sick-Room.

PREPARATION AND FURNITURE.

Not merely the comfort but the chances of recovery of a patient depend on the room which is selected for his or her treatment. The sick room should be large and cool, it should be lofty, and a large window or glazed door is necessary. For the room to be sufficiently airy there should, in India, be some form of cross ventilation, that is to say, there should be a window or another door on the opposite side of the room to the entrance.

The following seven points require special attention :—

1. The preparation and cleaning of the room.
2. The furniture.
3. The bed.
4. The bedding.
5. Warming and cooling.
6. Lighting.
7. Ventilation.

1. *The Preparation and Cleaning of the Room.*—A sick-room should be : (1) in a suitable position, (2) thoroughly clean, (3) airy and dry, (4) properly furnished, and (5) should contain as few articles as possible. The walls should be dusted, and all woodwork wiped with a clean cloth wrung out in a solution of cresol* (one teaspoonful to the pint of water).

* Or Jeyes' Fluid.

(1) *Position.*—The sick-room should be in such a position that the patient is segregated as much as possible from the other occupants of the house. In cases of infectious disease this is essential, but in any ailment the comfort of the patient is conduced to by treating him as far as possible from the noises and activities incidental to every household.

(2) *Cleanliness.*—In cleaning a room for the reception of a sick person the following points require attention :—

(*a*) The contents.
(*b*) The walls.
(*c*) The floors.

(*a*) *The Contents.*—When an apartment is to be utilised for a case of sickness the first thing to do is to empty it. Everything that is unnecessary should be taken away, so that practically nothing but bare walls, a bed and accessories are left. All articles of furniture in the form of chests of drawers, boxes, etc., are but so much air space cut off from the room. Carpets, curtains and all clothing not wanted are to be removed, cupboards which cannot be removed from the room must be emptied, as not only does all clothing occupy space, but it also serves to harbour germs and retain infection. If the case is infectious, or if a serious surgical operation is contemplated, the pictures should be removed from the walls, as every picture frame serves to store dust, and dust may spread germs and infection.

(*b*) *The Walls.*—The next thing is to dust the walls. This must be done by tying a damp cloth over a long pole and wiping the wall downwards from ceiling to floor. The work is to be done deliberately and slowly, taking especial care to wipe

the dust from the crevices and corners, from the cornice, from the upper parts of immovable furniture, and from the shelves of almirahs and drawers. The drawers of almirahs, chests of drawers, wash-hand stands, etc., must all be taken out, each set on its side, and freely wiped with a clean damp cloth.

(*c*) *The Floors.*—These require special treatment in the Tropics. They should be sprinkled with waste damp tea leaves, and the dust that is collected from the floors should be gathered on a piece of tin and burnt if the case is infectious.

In the hills and in modern bungalows, where good floors are provided, the floor may be scrubbed in the ordinary way, but where this is not practicable and the floor is covered with *chittai*, we must simply sweep the floor daily and at the end of any of the infectious diseases referred to in Appendix III remove and burn the *chittai*.

2. *The Furniture.*—The furniture of a sick-room should consist of as few articles of furniture as possible, and all of them should be such as are easily and effectually cleansed.

Woollen material retains smells and infectious particles longer than cotton or linen, and therefore heavy woollen curtains should never be used. There is no objection, however, to muslin or other washable curtains which lend an air of comfort to the room. Bed-curtains and valances are most objectionable, as they prevent the free circulation of air above and below the bed. *Durries* should be laid so as to be easily taken up when the room is being cleaned. They are not as objectionable as carpets, as they can readily be washed. Something must be placed on the floor to deaden noise and to keep the room from having

a look of discomfort, and the ordinary *durrie* is as good as anything in India.

3. *The Bed.*—The bed should be placed in a position so that the air may pass over it, and so remove impurities.

Neither side of the bed should be against the wall, both for the sake of ventilation and for the convenience of the attendant. In long-continued illnesses it is as well to allow even the head of the bed to stand away from the wall, as the head of the bed is the easiest position from which to help a much-enfeebled patient to sit up, lie down, or turn over. Besides, it allows of very free circulation of air round the bed, and opens a passage by which the attendants may move rapidly and quietly from one side of the room to the other.

The foot of the bed should be away from the window, as the light shining directly on the face of a patient often causes annoyance.

It is very useful in prolonged illnesses to have a *second bed* or a long couch in the room, on which the patient may be laid whilst his own bed is being aired or changed.

In infectious cases the *chairs* should be of the cane-bottomed type so familiar in India, so that they may be wiped all over with disinfectant solutions, but one cheap, comfortable, cushioned chair should be provided for the nurse's use. In infectious cases this can be destroyed if necessary at the end of the illness.

A piece of wood makes a quiet and efficient *poker*. There should be a good-sized *table* in the sick-room, and a smaller one beside the bed, covered with a clean cloth, for holding medicine bottles, etc. The larger table should have writing material for the nurse's use in marking up the charts and making her notes for the doctor's information

When an invalid is able to sit up in bed his meals may be given him on a *bed-table,* which should be two feet long and one foot wide and one foot high. It is placed across the bed, the legs resting on each side of it. If the front is slightly hollowed out the table can be placed closer to the invalid's chest.

The strictness with which the furniture of the room is arranged for illness depends upon the nature of the complaint. In *infectious* diseases the articles mentioned above should be the only ones allowed. Anything that is unnecessary or easily damaged is quite out of place, as *everything that has been in the sick-room will have to be thoroughly disinfected.*

CHAPTER II.

The Bed and Bedding of the Sick-Room.

A metal bed should be invariably used for cases of illness, as it can be more readily cleansed and taken to pieces than a wooden one. *Newar* beds are very largely used in this country, but the *newar* is very difficult to keep taut, and therefore beds of this kind rapidly sag and become uncomfortable.

The following points require consideration :—

1. The bed itself.
2. The position of the bed.
3. The bedding.

(1) *The Bed Itself.*—The length of the bed should be six and a half feet, and its width three feet. A wide double bed should never be used, as, if the patient is in the centre of the bed, it is impossible to wash, feed, or dress him satisfactorily. The *Lawson-Tait* pattern of wire mattress is the best, as it does not sag in the centre like other varieties. Moreover, it does not afford the facilities for hiding insects provided by the spiral spring mattress. A piece of canvas or *durrie* should be spread over the wire mattress to prevent the mattress cover becoming rusty from contact with the metal.

The mattress should be of coir or cotton, and the ticking should be covered with a loose cover of unbleached cotton, which can be washed as required. Over the mattress a thin blanket should be spread, and a sheet placed over all. This under-sheet must be tucked firmly beneath the mattress all round, so as to be always taut. If allowed to become loose or creased it is not only uncomfortable, but is apt to irritate the patient, or injure the skin and promote the formation of bed-sores. *Keeping the under-*

sheet taut is one of the most important of the nurse's duties. Making up the bed is completed by an upper sheet and blanket according to the season of the year. A counterpane of washing material should always be used as it keeps the blankets clean. Eiderdown quilts are not permissible in the sick-room as nothing should be used which cannot be washed. Pillows should be covered with cotton or linen pillow-cases. A valance round the bed is still used is some houses, but it should find no place in the sick-room. The valance is not infrequently used to screen utensils beneath the bed, and it also serves to conceal boxes, boots, etc., things which should never be placed beneath the bed, valance or no valance. Bed-curtains and valances harbour dust, and prevent the free circulation of the air beneath the bed, which is as essential to health as the circulation of air over and around it.

In the East, mosquito nets are essential. They must be hung inside the upright supports and tucked in all round, under the mattress. They must not hang on the ground, and must be *nets* and not *curtains*—that is, there must be no opening in them. They must be stretched fairly tightly to allow of perflation of air. The flat or upper side of the curtain must on no account be of calico as this interferes seriously with ventilation.

The nurse must, where practicable, avoid a bed that shows any tendency to sag : a flat bed is what is required in all cases of illness.

Fracture Beds.—A " fracture bed " is required in case of fractures of the lower limbs or of the pelvis. It can be made from an ordinary bed by laying a board of sufficient size beneath the wool mattress and over the wire mattress or *newar.*

(2) *The Position of the Bed.*—It is laid down in some English text-books that the bed should be placed between the window and the fire-place, so that a current of air may

pass over the patient as he lies in bed, but this is of little use to us in India as many of our houses in this country have no fire-places. The nurse, moreover, is given instructions as to where she should stand and how she should approach her patient so as to avoid infection herself. This may be *stage* nursing, but it is not practical nursing of the sick. The nurse has to approach her patient on whichever side she can best attend to him, and the thought of infection, as far as she herself is concerned, should never enter her head. The bed should be placed where the circulation of air is free, but not in a draught, and all the requisite hygienic requirements are fulfilled in India by placing the bed between the door and the window. The bed should never be placed so that, as the door opens, the patient is exposed to the stares of servants and others.

To sum up, the best position for a sick-bed is as follows—

(*a*) With its head towards the wall.
(*b*) With the foot towards the centre of the room.
(*c*) Sufficiently far from the walls that both sides can be easily reached.
(*d*) In such a position as not to be seen when the door is opened.
(*e*) So that a free circulation of air is possible round the bed, without the patient being in a draught.

(3) *The Bedding.*—An evenly packed cotton, coir, or aloe fibre mattress is quite as good as a hair one, and infinitely cheaper in the Tropics. One great advantage of a cotton bed is that if it is soiled it can be emptied and the cover washed and refilled easily, rapidly, and cheaply.

The *bed-clothes* should be warm and light. The coloured blankets, which are so popular in India, should never be used in private cases as they do *not* show the dirt. A heavy cotton counterpane should be avoided as it keeps in perspiration, and is not so warm, weight for weight, as a blanket.

An under-blanket need not be used except in winter; it should be large enough to be tucked in at both sides of the mattress so as to keep it smooth. A wrinkled under-blanket often helps to cause bed-sores.

Except in acute rheumatism, sheets are better next the skin than blankets, as blankets may become moist and act like poultices, and so cause bed-sores. The feet should be kept warm, as little weight as possible being over the chest. The nurse should remember that shivering and complaints of chilliness may indicate feverishness and therefore do not always require additional bed-clothes or a hotter room. A hot-water bottle to the feet is often the best treatment, but a fit of ague requires more covering as well.

Air and Water-Beds.—Air and water-beds are used in certain cases. They are preventives against bed-sores.

The air-bed is laid on the top of an ordinary mattress. If filled too full, an air-bed may be hard and uncomfortable. Two under-blankets should be placed over the air-bed, and the bed made in the usual way.

A water-bed is sometimes used in cases of paralysis and prolonged illness. After being placed in position on the bed it is filled with water at a temperature of 90° F. It must not be filled too full, and it must be emptied before any attempt is made to move it. To test whether an air-bed or water-bed is filled sufficiently the nurse must lie down on it and try it.

Both air-beds and water-beds must be thoroughly cleansed after use, and great care should be taken to avoid damaging them with pins.

The blankets under a patient, when covering these beds, require frequent changing, as they become damp from perspiration.

CHAPTER III.

Warming, Cooling, Lighting, and Ventilating the Sick-Room.

1. *Warming.*—An open fire-place is the best means of warming an Indian sick room, as it ventilates the room as well as warming it. Stoves have numerous disadvantages. For instance, they make the room too dry, scorch the air and not infrequently add a poisonous gas to it. The iron *sigri* with charcoal is to be avoided, as the fumes of charcoal are particularly dangerous in closed rooms, and even in well-ventilated rooms give rise to headaches. Oil stoves must not be used to warm a sick-room as they add waste products to the air and render it impure. Coal and wood should be obtained in medium-sized pieces which can be wrapped in paper, picked up by the fingers to avoid noise. The fire should be poked when necessary with a piece of stick for the same reason.

The room temperature should, in most cases, be kept at from 60° to 70° F. in the winter, and as low as possible in the hot weather. A nurse should remember that the coldest time of the twenty-four hours is between one and four o'clock in the morning, and it is then that a fire is mostly needed in the winter months.

2. *Cooling.*—Punkahs, thermantidotes, khuskhus tatties, and electric fans are the means at our disposal for reducing the temperature of a tropical sick-room. The punkah is so familiar that it requires only a very brief reference. It is a poor means of reducing the temperature, but generally it is the only one available. The thermantidote is a powerful but dangerous means of cooling a room. It requires constant supervision from the nurse. Khuskhus tatties are excellent, but only valuable when hot winds are blowing. The water used with tatties or thermantidotes is with advantage tinged with permangan-

ate of potash, as this keeps the tattie fresh; a little Sanitas also gives a refreshing smell, but is expensive unless used sparingly. Electric fans are far and away the best means of keeping a room cool, but they are, unfortunately, seldom available in India. The Jost fan is a good substitute, but sick people frequently object to the smell and puffs of hot air which are often given off.

3. *Lighting.*—The first gift that God gave the world was light, and it is the greatest. Light and life, death and darkness, go together. Remember this in the sick room. There are few complaints that require a shaded room. Ophthalmia, generally, must be nursed in a darkened room, also some forms of brain disease, and the acute stage of smallpox. When the eyes are weak after measles, too much light is bad. These, as a rule, are the chief cases in which it is well to keep out the light. There are exceptions, of course; for instance, a person in great pain often cannot stand the light, and when a person has been awake and restless in the night, he may wish to sleep in the day, and the nurse must darken the room to let him do so.

In the hot weather "up-country" the necessity of shutting up the rooms to keep out the hot air during the time when the sun is fierce necessitates the sick-room being large, but it is not necessary for the room to be darkened.

4. *Ventilation.*—By ventilation is meant the supply of air to, and the removal of impure air from, an apartment.

Composition of Air.—Air consists almost entirely of two gases, oxygen and nitrogen; of the former rather more than one-fifth; of the latter slightly less than four-fifths. There is, in addition, a minute trace of other gases, 4 per thousand parts of carbonic acid, and a small quantity of watery vapour.

The air of a closed sick room very soon becomes loaded with impurities, as patient and nurse are constantly engaged, during the act of respiration, in removing oxygen from, and adding carbonic acid gas and organic matter to the air. The atmosphere is rendered still more unwholesome by emanations from the patient's body, linen, and excreta ; by any foul wounds or soiled dressings; and by the lamps, each of which consumes many times as much oxygen as a man.

From the above facts it will at once be seen how important it is that the personal cleanliness of the patient should be constantly attended to and that all excreta or soiled dressings be removed from the sick-room without delay. In addition, in order to counteract this continual fouling of the atmosphere, a frequent and thorough changing of the air is essential.

The Principles of Ventilation.—The principles to be kept in view are : (*a*) that the air within the sick-room shall be as nearly as possible as pure as that outside, without chilling the patient; (*b*) that the temperature of the sick-room is maintained at a comfortable standard, which varies in the Tropics from 65° to 80° F. ; and (*c*) that ventilation be systematic, and sufficiently thorough to completely renew the air in the room at least three times in an hour.

There are two simple, but all-important, facts to be remembered in carrying out these principles of ventilation. These are :—(1) air expands when it is heated : from this it follows that, as the air in a room expands, some of it escapes by the nearest outlet ; and (2) that, as a result of its expansion, hot air is lighter that cool air, on this account hot air will rise, and cool air, being heavier, will fall.

Outlets.—Foul air escapes from an Indian room by (*a*) the fire-place, (*b*) the windows, and (*c*) the doors. Being lighter than pure air, foul air will be found in the upper part of the room, and therefore the clerestory windows, almost universal in our Indian bungalows, should always be left open—even in the coldest weather—to enable the hot, impure air to escape.

The fire-place, on the rare occasions when we have a fire in India, is a most important aid to ventilation, as when a fire is burning there is a constant current of air leaving the room by the chimney.

Inlets.—Fresh air enters an Indian room by (*a*) the doors, and (*b*) the windows.

Windows have already been considered as outlets for foul air; they also act as inlets for a large quantity of pure air, and should be constantly open. Fresh air also enters a room every time the door is opened, and underneath the door even when shut; but, if this air is from the inside of the building, the door should not be regarded as a suitable means of ventilation.

Patients frequently complain of draught when the windows are kept open; the nurse must therefore use consideration and tact, as well as firmness, and when cold or draught is complained of give her patient an extra blanket or a hot-water bottle, by which it will be found he can generally be kept quite warm and contented.

This question of ventilation requires unremitting attention from the nurse. Neglect of this duty will favour the development or spread of disease, retard the healing of wounds, and generally lower the health of her patients. To test the air of a room, the attendant should from time to time go into the open air; on re-entering she will at once be able to detect any defect in ventilation by the presence of a stuffy smell.

CHAPTER IV.

Infectious or Communicable Diseases.

Communicable diseases used to be divided into "contagious" and "infectious," the idea being that some were spread by *direct* contact, and others through the air by means of material which had been near the patient without actual contact, but the distinction has now been abandoned by physicians, as it is difficult or impossible to differentiate diseases in this way, so all diseases which spread in epidemic form from man to man are spoken of as *infectious* or communicable diseases.

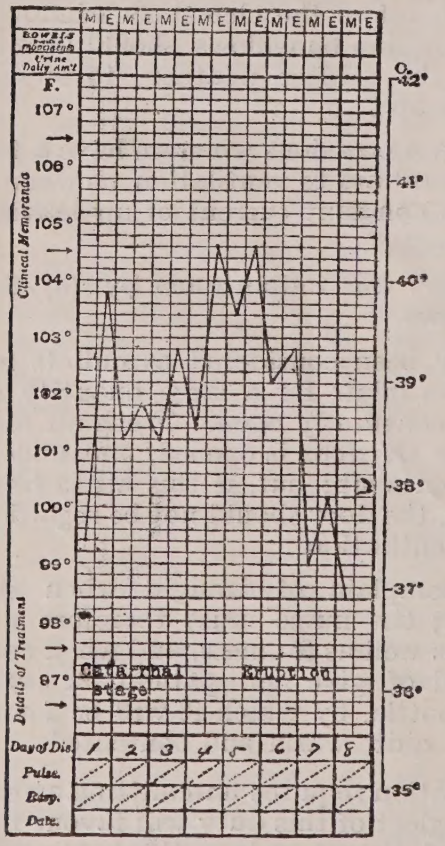

Fig. No. 1, Chart of Measles.

They may be spread by (1) air, (2) water and food, (3) by inoculation through an abrasion, (4) by means of insects, and (5) by clothing or excretions.

(1) The following are spread through the air;—

1. Scarlet Fever.
2. Influenza.
3. Chicken-pox.

4. Typhus Fever.
5. Measles.
6. Mumps.
7. German Measles.
8. Whooping-cough.
9. Croup and Diphtheria.
10. Small-pox.
11. Consumption or Tuberculosis.
12. Spotted Fever.
13. Leprosy.

(2) The following are spread by food and water :—

1. Dysentery.
2. Diarrhœa.
3. Cholera.
4. Enteric Fever.
5. Scarlet Fever (Scarlatina).
6. Diphtheria.
7. Mediterranean Fever.

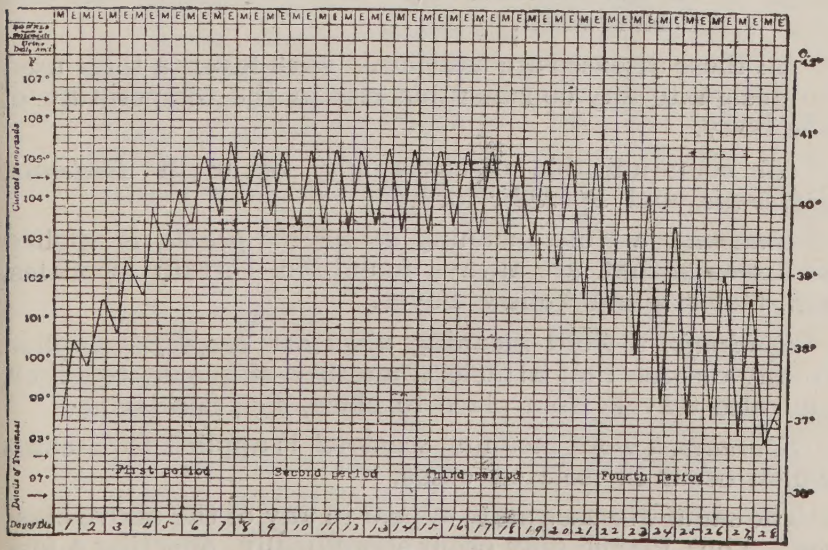

Fig. No. 2. Chart of Enteric Fever.

(3) The following are contracted through wounds or abrasions :—

1. Erysipelas.
2. Lock-jaw.
3. All kinds of blood-poisoning.

(4) The following are spread by insects :—

1. Malaria.
2. Sleeping Sickness.
3. Elephantiasis.
4. Kala Azar.
5. Sandfly Fever.
6. Yellow Fever.
7. Plague.
8. Relapsing Fever.
9. Dengue.

(5) The following are spread through clothing and excretions :—

All the members of the first three groups and also Ringworm.

All these diseases are associated with fever, a term used to designate any considerable rise in the temperature of the body.

All communicable diseases may occur in *Endemic*, *Epidemic*, and *Sporadic* forms.

Endemic, a word meaning *among the people*, is applied to diseases that are always found in certain localities, *e.g.*, Malaria and Yellow Fever.

Epidemic, a word meaning *upon the people*, is applied to any disease that attacks a number of people together, and also travels from place to place, *e.g.*, Scarlatina.

Sporadic, a word meaning *scattered*, is applied to diseases which occur in isolated cases.

The same diseases may appear in any of the above classes. Thus Plague may occur sporadically, affecting a few

persons scattered here and there, or it may rage endemically in the poor part of a large town, or it may spread epidemically in all directions.

The fevers may be classified as follows :—

1. *The Continued Fevers.*—Enteric Fever—Typhus Fever—Relapsing Fever—Influenza—Yellow Fever—Dengue.

2. *The Periodical Fevers.*—Intermittent Fever—Remittent Fever—Pernicious Malarial Fever.

3. *The Eruptive Fevers.*—Scarlet Fever—Measles—German Measles—Small-pox and Chicken-pox.

4. *Fevers with marked local manifestations.*—Rheumatic Fever — Pneumonia—Cerebro-spinal Fever—Diphtheria—Plague.

STAGES OF FEVERS.

The course of a communicable disease is divided into five stages, *viz.* (1) The *Stage of Incubation.*—The period between the exposure to, or absorption of, the infection of a disease and the outbreak of symptoms is called the incubation period. It varies greatly in different diseases, and even in different cases of the same disease. (2) *The Stage of Invasion.*—This dates from the actual beginning of the attack. The rise in temperature generally begins with the commencement of this stage. (3) *The Stage of Eruption.*—This stage commences with the appearance of the rash and is, of course, absent in those diseases which have no characteristic rash. This is sometimes, but rarely, wanting : the absence of rash is often a dangerous symptom. (4) *The Stage of Defervescence.*—The period during which the temperature falls to normal. (5) *The Period of Convalescence.*

Fever is caused by a poison entering the blood. It has the effect of more or less paralysing the nervous system, and thus suspending its power of regulating the vital processes. The heart beats more rapidly. The

power possessed by the intestines of absorbing food is lessened, and the tissues of the body are consumed by the increased temperature.

Consequently the body wastes, and the kidneys are unable to get rid of the used-up materials which accumulate in the blood, giving rise to head symptoms and local inflammations. These actions may go on increasing until they become incompatible with life, or the poison counteracted, the body gradually shakes off the abnormal conditions and resumes its healthy action.

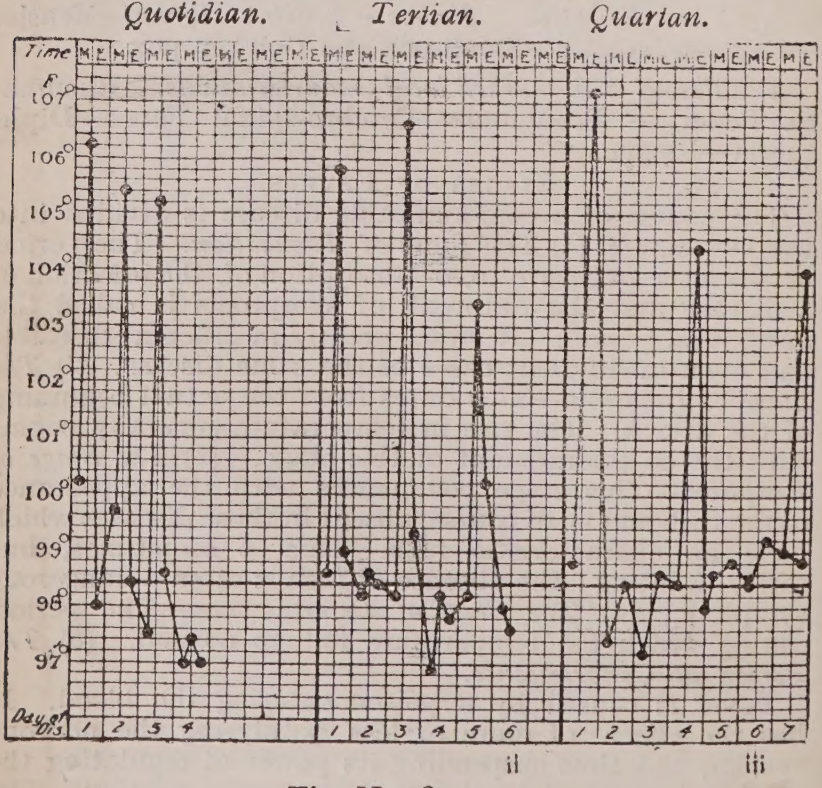

Fig. No. 3.

Chart showing the three varieties of Malaria, *viz.*— Quotidian Ague; Tertian Ague; Quartan Ague.

TABLE OF THE COMMUNICABLE DISEASES.

Appendix III.

Disease.	Mode of Infection.	Period between contracting disease and development of symptoms.	Character of onset	Chief symptoms and appearance of and colour of rash.	Primary Situation of Rash.	Range of Temperature.	Rash Fades.	Duration of Illness.	Duration of Infectivity.	Preventive Measures.	Quarantine periods for Contacts; and special Remarks.
AGUE OR MALARIA (Ague & Malaria popularly believed to be different are same disease).	Through mosquitoes which bite infected persons and long afterwards convey the parasite to healthy persons.	Quartan about 3 weeks. Benign Tertian 2 weeks. Malignant Tertian 8-12 days.	Sudden	Three stages :— (1) Hot. (2) Cold. (3) Sweating.		May reach 106° ..		Varies with type of fever.	So long as the parasites are to be found in the blood.	(1) Aim at the extermination of mosquitoes of all kinds. (2) Protect from mosquito bites by always using mosquito nets and suitable clothing. (3) Take quinine. The drug remains in the blood for four days, therefore 15 grains should be taken twice weekly.	There are three types of malaria due to different parasites. Two are readily cured by quinine. The third is not.
CHICKEN-POX ..	By direct contact with a person suffering from the disease.	14 days	Sudden	On first day of illness red pimples appear in crops, rapidly passing into little pearly blisters.	On back, chest, abdomen, and covered parts.	Not usually above 100°.	Scabs form about 4th day of fever.	4 to 7 days ..	2 weeks	Isolation and disinfection.	20 days.
CHOLERA	From excreta, through milk, water, food, dust, flies, or clothing.	3 to 6 days ..	Sudden	Three stages :— (1) Diarrhœa. (2) Vomiting, cramps, rice-water stools, suppression of urine and collapse. (3) Re-action.		There is usually no fever.		A few hours to several days.	Till stools are free from Cholera bacilli.	(1) Drink nothing but tea or boiled water. (2) Avoid raw fruits and uncooked vegetables. (3) Seek medical advice for the slightest digestive disturbances.	5 to 10 days.
DIPHTHERIA. (OR SO-CALLED MEMBRANEOUS CROUP.)	Through breath, also carried by cats and fowls.	2 to 7 days. Oftenest 2 days ..	Gradual	(1) Sore throat. (2) Difficulties of swallowing. (3) Paralysis of throat muscles rendering swallowing difficult and giving a peculiar twang to voice		Up to 100°		Variable	Person may be infective for 6 weeks.	Isolation and disinfection. Antitoxin is a good preventive.	12 days.
DYSENTERY ..	Same as Enteric Fever ..	Bacillary :— 36 hours to 7 days. Amœbæ: 3—12 weeks.	Gradual	Three characteristic symptoms in acute cases :— (1) Diarrhœa. (2) Cramps and straining. (3) Blood or mucus in stools. Blood is by no means always present in true dysentery.		Never high		Variable	Whilst the *Bacilli* or *Amœbæ* which cause the disease are to be found in the stools.	(1) Isolation. (2) Disinfection of excreta.	There are two varieties. One due to *Bacilli* and the other to a minute animal called *Amœba Histolytica*.
ENTERIC OR TYPHOID FEVER.	From excreta, through milk, water, food, dust or flies.	14 to 21 days ..	Gradual	A few rose-coloured raised spots. Frontal headache, lassitude, pea soup stools, or constipation.	On abdomen ..	Lower in morning than evening.	Variable ..	21 days or longer.	A month or longer. ..	(1) Isolation. (2) Disinfect most strictly all urine and stools, and everything that has touched the patient. (3) Preventive inoculation. (4) Habitually avoid all fruit without skins, and uncooked vegetables. (5) Destroy flies.	All contacts and nurses who have been nursing cases of enteric should be quarantined for a month.
INFLUENZA ..	Through breath, clothing, etc. Readily carried from place to place in trains, etc.	1 to 5 days. Oftenest 3 days.	Usually abrupt ..	Herpes or "Breaking out of a cold" is common. Diffuse red, bluish or purplish mottling are sometimes seen.	Herpes, if present, appears round the mouth.	Variable. May be only the symptom in feverish type or absent in nervous variety.	There are four types of the disease. (1) *Catarrhal* :—affecting respiratory tract from nose to lungs. (2) *Nervous* :—headache, backache and prostration. (3) *Intestinal* :—diarrhœa and vomiting. (4) *Feverish* :—may simulate typhoid or enteric.		2 to 6 weeks, according to type of fever.	Strict disinfection and isolation.	Nearly every variety of ill-health has been said to follow influenza, if neglected. If treated early, complete recovery is the rule.
GERMAN MEASLES..	Direct contact	9 to 18 days ..	Sudden	Round or oval slightly raised spots, pink in colour, appear on 1st day.	Face, then chest and gradually spreads to whole body.	100° highest ..	Third day ..	4 to 5 days ..	1 week	Isolation and disinfection.	20 days.
HYDROPHOBIA ..	Bites of infected animals, dogs, wolves and cats.	7 days to 2 years; usually 6 weeks.	Gradual	Restlessness, inability or difficulty in swallowing. Convulsions of throat and respiratory muscles follow. Death is due to suffocation or exhaustion.			There are two types in animals :— (1) Furious.—Characterised by restlessness, irritability and altered bark. Fear of water is *not* a symptom. Animal tears and worries unusual substances. (2) Paralytic.—Characterised by paralysis of jaws, loins, and hindlegs.			(1) Cauterise bites of all dogs, etc., with a fluid caustic, such as nitric or carbolic acid. (2) Preventive inoculation at Pasteur Institute.	A dog or cat which had bitten a person should not be destroyed but kept under observation for ten days.
MEASLES	By the breath	1 to 2 weeks ..	Sudden	Appears on fourth day of disease. Dull red blotches, velvety to touch.	Behind ears and on forehead and face.	Up to 103°	On 7th day of fever.	10 days	Three weeks. Is very infective before rash appears.	Disinfection and isolation.	16 days. Very infectious during catarrhal stage before rash appears.
MUMPS	By direct contact.. ..	14 to 21 days ..	Sudden	Painful swellings behind angles of jaws. Difficulty in opening the mouth.	None	Up to 101°		7 to 10 days ..	2 weeks	(1) Isolation. (2) Disinfection. Do not treat as trivial malady, as Indians sometimes die of the disease.	12 days.
PLAGUE	Indirectly from rats through fleas. Possibly through air.	3 hours to 15 days. Usually 2 to 8 days.	Sudden	A rash resembling flea bites is common, but not constant.	Face or chest ..	Varies with type. There are three varieties :—1 Bubonic. 2. Septicæmic. 3. Pneumonic	Variable ..	About a month. Many cases die on 3rd to 5th day.	6 to 8 weeks	(1) Isolation and disinfection. (2) Destruction of rats. (3) Preventive inoculation. (4) Protection of feet and hands and abrased surfaces.	12 days.
PNEUMONIA ..	Through air, sputum, food, or, indirectly, through a third person.	16 hours to 5 days.	Sudden	Rigors, cough, headache, and rusty sputum.	Herpes round nose is common.	Very high		Crisis may be expected on 6th to 8th day.	14 days	Isolation and careful disinfection.	7 days.
RELAPSING FEVER.	Direct contact or through bites of infected bugs or fleas.	4 to 10 days ..	Very sudden ..	Rigors, giddiness, high fever ..	Flea-bite-like spots appear all over body.	High	Variable ..	Fever lasts for a week. Ends by crisis, and after a week starts all over again. As many as five relapses may occur.	6 weeks	Avoidance of overcrowding and poor dietary; disinfection.	14 days.
SMALL-POX.. ..	Through air, from the skin and breath.	14 days ..	Sudden. Backache very marked.	Small red pimples becoming pocks, similar to those seen in vaccination, appear on 3rd day.	Face and exposed parts.	High at onset, drops when rash appears, and rises when matter appears in pocks.	Scabs form on 9th or 10th day and begin to fall off on 14th day.	14 to 21 days ..	About a month. A corpse is as infective as a living person. The dead are dangerous.	All persons coming in contact with cases must be vaccinated.	16 days.
SCARLET-FEVER. [Scarlatina is not a different and milder form of the disease, but merely the Latin for Scarlet Fever.]	By breath, mucous discharges, clothing, books, and scales from skin.	2 to 7 days ..	Sudden	On second day bright scarlet mottling. Cheeks look as if they had been rouged and there is a marked pale circle round the mouth.	On chest	Up to 105°	On 5th day of fever.	10 days if there are no complications.	6 to 8 weeks or until "peeling" has ceased.	Isolation and disinfection.	10 days.
TUBERCULOSIS ..	Through air, from sputum or milk.	Uncertain ..	Gradual	Fever, Debility, Wasting, Cough. Hæmorrhage from the lungs.		Slight, early in the disease.		Variable ..	In tubercle of lungs, exists throughout the disease.	(1) Isolation of infected person. (2) Disinfection of clothing, etc. (3) Efficient inspection of milch cows.	21 days.
TYPHUS OR CAMP FEVER.	Through bugs.	12 days ..	Sudden	Mulberry coloured spots, "parrot tongue," flushed face and delirium.	Abdomen and upper part of chest.	May reach 107° ..	End of 2nd week.	Crisis on 14th day, followed by rapid convalescence.	5 weeks..	Isolation and disinfection.	16 days.
YELLOW FEVER ..	Through special breed of mosquitoes called the *Stegomyia*.	2 to 5 days ..	Sudden	Three or four days fever followed by black vomit and bloody urine.	The whole body turns yellow.	Very high	Yellow coloration persists throughout the disease.	Mild cases a week: severe, a fortnight or longer.	Only infective 2nd and 3rd day of fever.	(1) Destroy the special mosquito. (2) Prevent its access to water tanks. (3) Mosquito nets	Mosquito only able to infect twelve days after becoming contaminated.
MALTA FEVER ..	Through goat's milk ..	6 to 17 days ..	Gradual	Headache, Boneache, Rheumatic inflammation of joints.		Gradual rise to 104°. Gradual fall to normal with one or more relapses.		Average is 4 months.		Avoid goat's milk. The British residents at Malta now use only tinned or dried milk.	16 days.
WHOOPING COUGH..	Through breath or clothing. Rarely carried by nurses or governesses, from patient to patient.	4 to 14 days or longer.	Gradual. Commences as a common cold in which cough is usually incessant.	Child coughs until it is blue in the face and then whoops. Vomiting often occurs after coughing. Fits usually occur four or five times daily; but in severe cases they may occur every half hour. Few diseases are more painful to witness.		There is usually only slight fever at the commencement.		6 weeks or longer.	Whilst whoop persists.	Isolation and disinfection of sputum, clothing etc.	21 days to allow for cases in which whoop is delayed.

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The reason infectious diseases are so common in childhood is that people are born with a natural susceptibility to these diseases, but gradually develop a power of resisting them, which is called "immunity."

The older a child is the more immunity or resisting power it has stored up and the stronger it is to resist disease.

The old-fashioned idea therefore that childish diseases are necessary events in a child's life, and that children should be exposed to infection of such diseases as measles and whooping-cough, is not only erroneous but most dangerous. There is a double advantage in shielding a child from infection during the early years of his life, as not only does each year safely passed through render him less liable to contract the disease at all, but it tends to lessen the severity of the disease should he eventually contract it.

The incubation period of all fevers, that is the period during which they are being, so to speak, hatched, is generally marked by a train of symptoms simple in themselves, but significant when they occur together and gradually increase in intensity. These are (1) Lassitude and disinclination for any form of exertion; (2) loss of appetite; (3) drowsiness by day; and (4) restlessness by night.

These symptoms are followed by the more or less sudden stage of "invasion" when the person has a rigor, *i.e.*, a shivering fit, and, if a child, usually vomits, and is so obviously ill a doctor must be summoned. After a period shown in Appendix III a rash may appear, when usually the temperature rises, the pulse becomes faster, the furring of the tongue increases, and commonly the mind wanders.

The patient often complains of giddiness or may become deaf. Restlessness is common, and not infrequently the patient lies in an apathetic state with half-closed eyes.

If the result is to be recovery there is now a change for the better, and *defervescence*, or the return to normal temperature, begins. It is usually gradual, the remissions between the evening and morning temperatures exceeding the evening rises, or exacerbations, as they are technically called, until the normal is again established. This form of defervescence constitutes *lysis*. On the other hand, the decline of the temperature is sometimes abrupt, the temperature falling in the course of a single night or in a few hours from a considerable height to the normal or below it. This is known as *critical defervescence*, or *crisis*. It is very often attended by some critical discharge, such as profuse sweating or diarrhœa, and is sometimes followed by collapse, which should be treated by extra blankets, hot water bottles and stimulants pending medical instructions.

Convalescence lasts until a normal state of health is regained.

Appendix III gives the features of the various infectious diseases.

When a child is attacked by a disease like scarlet fever or typhoid, if the parents cannot afford proper precautions and constant medical attendance for the patient, undoubtedly the best course is immediate removal to an infectious hospital; as not only will this remove the danger from the family, but will secure isolation from the rest of the community and ensure the best nursing. If the latter course is not adopted the patient must be isolated in one room and, as indicated in Chapter I, all furniture and draperies that can possibly be dispensed with should be removed from the apartment. Free ventilation should be provided. The door of the sick-room of an infectious case is usually covered with a sheet on the outside and the sheet is sprinkled with a 1 per cent.

solution of Cyllin, Carbolic Lotion (1 in 20), or some other similar disinfectant, but it is difficult to see what possible use this can be, except as a danger signal, as air from the room is not likely to pass out of it by the door and, if it does, it is not going to be so obliging as to defy the laws of Nature and pass through the wet sheet for the purpose of being disinfected, but will pass under, over, and around it. Some people advocate the free use of a disinfectant on the door mat.

No one should enter the room except the nurses, and they should have an adjoining room provided in which they can bathe and change into other clothing when going out for exercise.

It is best, where possible, to convert the vicinity of the room into a temporary hospital, and for the servants to deposit all food on a convenient table to be taken over by the nurses.

All children, both sick and healthy, in an infected family should be kept from school till all probability of their spreading infection among the other scholars is over.

The following periods are those during which children should be excluded from school, dating from the time of exposure to infection in the case of healthy children, and from the day disinfection has been completed in the case of infected children :—

Measles	16	days.
Scarlet Fever	14	,,
Chicken-pox..	20	,,
Smallpox	16	,,
German Measles	20	,,
Diphtheria	12	,,
Whooping cough	21	,,
Mumps	24	,,
Typhoid or Enteric	30	,,

CHAPTER V.

Disinfection and Disinfectants.

After all cases of infectious disease, everything which has been in contact with, or near, the patient should be efficiently disinfected, and we would here point out that many sanitary sins have been committed in the name of disinfection.

Unfortunately the word "disinfectant" is not legally protected, and the result is that many substances with little or no power of destroying germs are largely sold and utilised, with disastrous results, as supposed preventives of infection.

The object of disinfection is to destroy the germs of disease, but unfortunately three groups of agents are usually confused together under this single heading, *viz.* :—

1. *Antiseptics, i.e.,* substances which arrest the action of bacteria but do not destroy them, such as boracic acid.
2. *Deodorants, i.e.,* substances which counteract disagreeable odours, such as charcoal, toilet vinegar, and many *so-called* disinfectants.
3. *Disinfectants Proper, i.e.,* substances which really destroy germs, such as carbolic acid.

1. *Antiseptics.*—An antiseptic is an agent which prevents decomposition. The application of this group is limited to substances and places whose removal or destruction is undesirable.

The word "antiseptic" means a preventive of sepsis or decomposition.

Antiseptics merely act by preventing the growth and development of the micro-organisms which induce sepsis. They do not destroy them.

2. *Deodorants.*—Decomposition and putrefaction are the result of micro-organic life in the beneficent work of resolving organic substances into their innocuous elements. During this transmutation malodorous gases are given off, and *deodorants* act by overpowering, absorbing, or breaking up these gases. They produce little or no effect upon the decomposing substances.

Odours are the tell-tales of filth, and simply masking them is a most fallacious remedy and should never be adopted, least of all in India.

3. *Disinfectants Proper.*—Disinfection, in the more restricted and accurate sense, implies the destruction of the infection produced by the specific micro-organisms of disease.

Happily, in addition to the practice of strict cleanliness, which removes and destroys microbes, we have a large group of other *true* disinfectants that may be classed under the following headings :—

1. Natural Disinfectants.
2. Physical Disfectants.
3. Chemical Disinfectants.

1. *Natural Disinfectants.*—Fresh air and sunlight will kill most germs, whilst all living micro-organisms are sooner or later attenuated in their disease-producing activities and finally killed by drying.

Thus the microbe of Asiatic cholera, when dried, dies in from three hours to two days, according to the degree of desiccation.

The bacilli of enteric fever are destroyed in from one and a half to two hours by the direct solar rays, and in five hours by diffuse daylight. The diphtheria bacillus is destroyed by from one-half to one hour's exposure to direct sunlight; while the tubercle bacillus, the cause of consumption, is killed by the rays of the sun in from a few minutes to several hours, according to the thickness of the mass exposed.

The influence of drying on the multiplication of bacteria, for none of them develop in the dry state, is of manifest importance, as it shows that the maintenance of the habitation and surroundings of the Indian bungalow in as dry a state as possible is a stringent sanitary necessity. The frequent airing of bedding and clothing secures the desired dryness; and, in addition, the oxygen of the air and light of the sun exercise a destructive effect on such organisms as may be harboured in these articles, whilst the agitation to which they are subjected in a very strong breeze not only mechanically dislodges and removes a considerable proportion of the adherent microbes, but also markedly interferes with the development of certain species.

Nature's disinfectants are therefore fresh air, wind, and sunshine.

2. *Physical Disinfectants.*—The physical disinfectants consist of heat in its various forms, *viz.* :—

(*a*) Fire.
(*b*) Hot Air.
(*c*) Boiling.
(*d*) Steam.

(*a*) *Fire.*—Destruction by fire is the most thorough means of disinfection, and it should be always employed for articles of little value. Where

possible, the material should be soaked in kerosene to ensure complete and ready combustion.

The employment of a closed incinerator is desirable, as, if destruction by fire is carried out in the open air, small unburnt particles carrying infectious material may be scattered by the action of the wind.

(*b*) *Hot Air.*—This method of disinfection is now discredited, as it has been found to be unreliable.

Its *advantages* are (1) It is economical, (2) an ordinary oven can be used for the purpose in emergencies, and (3) within certain limits, it does not destroy articles such as furs, leather, india-rubber, and bound books.

Its *disadvantages* are (1) That it has slow and feeble penetrating powers, (2) it is likely to stain certain articles, and (3) it renders some articles brittle and damages others.

(*c*) *Boiling.*—This is one of the best methods of disinfection. There are few organisms which will stand boiling for a few minutes, and still fewer which will stand a subsequent washing in soap and water.

The *disadvantage* of boiling is that it is apt to fix stains, and if it be employed, *e.g.*, for clothes, these must first be soaked in cold water, washed with soap and soda, and then boiled for half an hour. The water in which they have been soaked and washed must also be disinfected by boiling.

(*d*) *Steam.*—Applied in special forms of apparatus, steam is now largely utilised in the tropics for the disinfection of bedding and clothing. Its superiority over hot air is due to the following reasons :—

(1) *The large amount of latent heat in steam.*—When steam condenses it parts with an immense amount

of what is called latent heat, which is all available for disinfection.

By latent heat is meant the heat which becomes hidden so to speak, when water passes from the liquid to the gaseous state. This "hidden" heat becomes again "evident" when the steam condenses.

(2) *Its penetrating power.*—The condensation of steam is accompanied by a diminution of volume and the creation of a partial vacuum in the interstices of the article being disinfected. To fill up this vacuum more steam presses forward and condenses until every part of the material is penetrated.

(3) A lower temperature continued for a shorter time suffices for adequate disinfection.

(4) There is less risk of fire and of injury to most fabrics and materials.

3. *Chemical Disinfectants.*—The number of chemical disinfectants on the market is enormous. They may be divided into the following groups :—

(*a*) Gaseous.
(*b*) Liquid.
(*c*) Solid.

(*a*) *Gaseous.*—The principal gaseous disinfectants are burning sulphur, formaldehyde, and chlorine.

Burning Sulphur.—The gas produced by burning sulphur has been in use for centuries as the most convenient form of gaseous disinfection. It is essential that all surfaces with which the gas is to come into contact should be thoroughly damped as the gas only acts in the presence of moisture.

Rolled sulphur, or the specially prepared sulphur candles, should be used, as the powdered sulphur of the

bazaars is frequently impure. Two pounds of sulphur are required for each 1,000 cubic feet of space.

Formaldehyde.—This gas is liberated from formalin tablets by heating in some special form of lamp; it has largely replaced Sulphur of recent years.

It may be readily generated by pouring Formalin on Permanganate of Potash.

One pint of Formalin poured on ten ounces of Permanganate in an ordinary galvanised iron pail is sufficient to efficiently disinfect 2,000 cubic feet. The period of disinfection should be six hours. From 60° to 70° F. is a proper temperature, and the air of a room must be rendered moist in a dry climate.

The method is very effective, simple, rapid, and by virtue of the inexpensive apparatus required preferable to the older and more cumbersome methods.

Chlorine.—This element is useful as a disinfectant, but is a powerful bleaching agent, and should only be used where the other two gases mentioned are not available. Half a pound of hydrochloric acid, or any other mineral acid, will liberate the gas from two pounds of chlorinated lime.

It should be borne in mind that the *air* of an infected room can be readily changed, and therefore does not require disinfection. Moreover, micro-organisms have weight and do not remain in the air, but sink on the floors, walls, and furniture so that our attention should be devoted to them.

(*b*) *Liquid.*—There are five substances, or groups of substances, in common use in the tropics as disinfectants, *viz.* :—

(1) *Perchloride of Mercury or Corrosive Sublimate in solutions of various strengths.*—This has the advantage

of being a most powerful and cheap disinfectant. Its disadvantages are : (1) that it is very poisonous to man, but slightly so to insects, (2) it corrodes metals, stains linen and (3) its solution has neither colour nor smell.

(2) *Carbolic Acid.*—This is a good disinfectant, but expensive and poisonous. It has now been largely replaced by the cheaper and less poisonous products of coal tar.

(3) *Saponified Cresol.*—This is the preparation officially adopted by the Military Department in India out of a great mass of tar oils now on the market. It is cheaper and more efficient than carbolic acid and not nearly so poisonous.

(4) *Formalin.*—This has an irritant odour, but is harmless to colours and metal work with the exception of iron. It is a fairly cheap, rapid, and reliable disinfectant in one per cent. solution.

(5) *Phenyle.*—This is a popular, but comparatively feeble and expensive disinfectant as it is little more powerful than carbolic acid, whereas the tar oils, such as cresol, are many times stronger.

(*c*) *Solid Disinfectants.*—We shall only refer to four substances under this heading, *viz.* :—

1. Lime.
2. Chloride of Lime.
3. Permanganate of Potash.
4. Soap.

(1) *Lime.*—Freshly burned lime is a cheap and useful germicide. In the form of whitewash it is a disinfectant which plays a useful part in India. It is important to see that lime used for disinfecting purposes is fresh, as if stored for any length of time, the action of the air converts a large amount of it into chalk, which has no germicidal properties.

Some authorities have found that ordinary white-washing destroys all micro-organisms except those of anthrax (or the splenic fever of cattle and horses) and tuberculosis.

Prior to the application of whitewash, the surface should be well scraped, as we should aim at the removal of bacterial life, rather than its burial even under a germicide.

(2) *Chloride of Lime* :—This substance, known also as chlorinated lime and bleaching powder, is a powerful but disagreeable deodorant, and a disinfectant of considerable power. It consists of lime saturated with chlorine, and is of very unstable composition. It corrodes metals, blocks drains and destroys almost everything with which it comes in contact.

It used to be largely *misused* to hide offensive odours, Its chief legitimate use in India is to keep off flies, but for this purpose crude petroleum is better and cheaper as chloride of lime keeps badly in this country.

(3) *Permanganate of Potash.*—When used in five per cent. solution " permanganate " is a powerful disinfectant but, as generally used, in less than a half per cent. solution, it merely acts as a weak deodorant. It has the following disadvantages :—

(1) It is expensive, (2) it stains fabrics, and (3) it is too easily reduced to an inert form. It is used with advantage in the disinfection of wells.

(4) *Soap.*—Common soap is one of the most generally useful of the chemical disinfectants. The alkali in ordinary household soap not only actually destroys germs, but also tends to dissolve the outer covering of their seeds. It also washes away the greasy materials which frequently protect bacteria from the action of the natural disinfect-

ants, sunlight and oxygen, and is therefore a very valuable purifier.

When a case of infectious disease occurs the following *rules should be observed*:—

(1) Whenever a steam disinfector is available all articles of bedding, carpets, hangings, etc., which are not likely to be injured by steam, should be sent to the disinfecting station.

(2) When a steam disinfector is not available cotton and linen articles should be boiled for half an hour. Blankets and other woollen articles and coir fibre should be soaked for two hours in saponified cresol in a strength of one teaspoonful to each pint of water. Cloth articles should be sprayed with a five per cent. solution of pure carbolic acid in water and exposed to the sun for three or four days. Leather articles should be sponged with a one per cent. solution of formalin.

(3) Feeding and cooking utensils should be boiled for 15 minutes. Immersion in a 20 per cent. hot solution of washing soda suffices, however, for most infectious diseases, but it will not serve in cases of infection by the *tubercle bacillus*. Table knives, mounted forks, and similar articles which are likely to be damaged by high temperatures should be soaked for two hours in a one per cent. solution of formalin.

(4) The walls of the room occupied by the patient should be scraped and re-limewashed.

(5) Furniture, floors, and woodwork should be scrubbed with hot water and soap.

(6) Earthen floors should be saturated with a disinfectant preparation, preferably kerosene emulsion.

(7) The woodwork of latrines used by the patient should be scrubbed with a corrosive sublimate solution (1 in 1,000) and the floor saturated with the same solution.

The Destruction of Insects.

Good disinfectants are not necessarily good insecticides as, for example, corrosive sublimate, which, although it is one of the most powerful of all disinfectants, has little influence on insect life.

Fleas will emerge unscathed from an exposure of ten minutes in an acid solution of corrosive sublimate of such a powerful strength of 1 in 500. Moreover the disinfecting action of this chemical is considerably neutralised by organic matter on the floors of native huts and houses which are smeared with cowdung.

The best *insecticides* are *pesterine and kerosene oil emulsion.*

For general purposes the gaseous disinfectants should be used chiefly as insecticides. For efficient use as disinfectants the rooms to which they are applied should be carefully sealed up, and this is a very difficult procedure with the ordinary tropical room.

In a strength far short of that in which they will destroy bacteria they will, however, act as efficient poisons to mosquitoes and other biting flies which survive in nooks and crannies from one year to another.

1. *Pesterine.*—This substance is crude petroleum known as "fuel oil," and is undoubtedly a powerful insecticide, as it instantly kills all fleas, bugs, and other insects that come in contact with it. Its method of application is very simple, as it has only to be brushed on the

floors and the walls of the rooms to a height of about 3 feet. It is very cheap, as the cost of treating an average-sized room only costs about one rupee. It is not, however, an elegant preparation, hence its use in better class houses is open to some objection.

2. *Turpentine.*—This is an excellent material for keeping off flies, mosquitoes, etc., but its disadvantages are its cost and its smell.

3. *Kerosene Oil Emulsion.*—This emulsion is made according to the following formula: (1) common soap three parts, (2) water 15 parts, and (3) kerosene oil 82 parts.

The soap is dissolved in the water by the aid of heat and the kerosene oil is warmed and gradually stirred into the mixture.

It has been shown that one part in a thousand of this solution will kill fleas in two minutes.

It should ordinarily be used diluted with twenty parts of water.

The following plan for ridding a house partially or entirely of mosquitoes is strongly advocated by the author's friend, Sir James Roberts: Open all the doors and windows, including the clerestory windows at sunset, and do not light the lamps till after dark. The mosquitoes will leave the rooms to disport themselves in the compound, and if there is moonlight it acts as special attraction for them to come out of doors. Before lighting the lamps close the wire gauze doors or let down the chicks. If this is done for three or four consecutive nights mosquitoes are markedly diminished unless they are being bred in the compound.

CHAPTER VI.

The Nurse and Her Health.

There is a popular impression that every woman is a born nurse. In any other calling a person who has had no training makes endless mistakes, and the same rule applies to nursing. Every woman has, however, at some time or other to look after and nurse a sick person, and it is therefore incumbent on her, especially in India, to learn something about the art of nursing, as doing so will save thepatient much discomfort and help his recovery. It must be remembered that, no matter how skilled a woman may become in the art of nursing, she is always the helper of the doctor, and may only work independently until his arrival. A nurse, to be of use to the patient and the doctor, must be able to :—(1) Give a trustworthy account of what occurs between the doctor's visits. (2) Prepare and apply simple dressings. (3) Administer remedies. (4) Prepare simple articles of invalid dietary. (5) Remember and faithfully carry out the doctor's orders.

She must accept the fact that she may not know the doctor's plan of treatment, nor his full opinion as to the disease from which her patient is suffering. Once she has shown her obedience and reliability the doctor will seek her help, and give her his confidence.

A good nurse must exhibit the following qualities :—

(1) Good temper, (2) cheerfulness, (3) inexhaustible patience, and (4) untiring energy.

During the period of illness the patient is entirely at her mercy, bodily, and often mentally as well, and entirely dependent upon her for all his comfort and in many cases for his chance of recovery. A nurse has countless opportunities of relieving physical and mental suffering by her care, or she may increase it by her carelessness and sometimes by her bad temper. A nurse's work may, therefore be summarized as follows :—(1) To carry out the doctor's orders, (2) to watch the patient so as to give an intelligent account of his condition during her tour of duty in the sick-room, (3) to supply the patient's wants, and (4) to help him with her care and tenderness.

Doctors are especially careful in employing nurse to select those who are loyal to them, and who, if they wish to talk over the case, will do so with the doctor, and not with the patient, as this alarms the latter. A nurse who discusses the doctor behind his back or the patient's illness with the patient himself is not employed again.

There are six qualifications which most women possess and it is the careful training of these qualities that produces a good nurse. Without them no diploma is of any avail.

1. Presence of Mind.

This quality enables the nurse to see what is required in an emergency.

2. Gentleness.

This quality will make her careful of the feelings of her patient, and considerate and delicate in the discharge of her duties.

3. Forethought.

This will enable her to anticipate the wants of her patient, and thus save him from the irritation of asking for things which should be given him without asking.

4. Memory.

A good memory is a most desirable qualification in nursing, but, however good her memory is, a nurse must not rely on it. She should write down all her instructions and remember to carry them out to the letter. If she forgets she must have the courage to "own up."

5. Observation.

The nurse must cultivate the art of carefully noting and remembering everything the doctor is likely to want to know, such as the action of remedies, the amount of sleep, etc.

6. Accuracy.

The nurse must be strictly accurate in all her reports to the medical attendant, as the treatment, and indirectly the life, of the patient may often depend on the nursing reports.

She should prepare and keep a nursing chart such as the one shown (Fig. 4). The nurse should move quietly about the sick room, but should avoid over-stealthy movements as they may startle the patient.

Name..... Date.....

Time.	Sleep.	Medicine.	Action Bowels.	Urine, amount passed.	Food. Kind and Quantity.	Doctor's Orders.
A.M.						
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
P.M.						
1						
2						Even- ing. / Morn- ing.
3						
4						
5						Temp.
6						
7						Pulse.
8						
9						Respi- ration per minute.
10						
11						
12						

Fig. No. 4.

The above chart affords a ready means of recording everything of importance and enables the nurse to give the doctor an accurate report of the patient's progress.

Enlarged copies of the chart may be obtained from the St. John Ambulance Indian Stores Depot, Bombay.

The Nurse's Health.—The preservation of a nurse's health is of the utmost importance both to her and to her patient. The bodily exertions and wearing mental anxiety inseparable from nursing make heavy demands on the system, and the fact that nurses have often to do many things which are repugnant to refined and cultivated women, increases the risk of breaking down.

The strain of nursing a near and dear relative may go on for weeks on end, and often by day as well as by night; so it is especially necessary for the nurse to know, *and remember,* what to do to preserve her own health, if only in the interest of her patient.

Regular exercise in the open air every day is absolutely necessary, and the minimum allowance should be half an hour's brisk walk every morning and evening.

The nurse's food must be nourishing and light. She must have her meals at regular hours, and she must on no account eat them in the sick-room. If practicable she should eat them in company, as solitary meals are very apt to be bolted.

She should pay careful attention to the state of her bowels as the sedentary and confined life is apt to lead to constipation.

Strong aperients should be avoided and some mild laxative taken, such as the Liquid Extract of Cascara or the Compound Aloin tablet now procurable at all chemists.

Sore throat is not uncommon whilst nursing a tedious case. Its presence should at once be reported to the doctor. If a nurse feels slack and cannot do her work

without a tonic she is doing too much, and should have a holiday.

A nurse should have a bath daily. Her hair should be well brushed morning and evening and washed every fortnight.

Nurses should clean their teeth after each meal so as to remove the smell of food from the breath, and so relieve the patient of a possible source of annoyance.

A nurse should sleep in a well ventilated room, and if called up during the night should wrap herself up carefully however great the apparent urgency of the call.

Before dressing a poisoned wound or ulcer she should carefully cover any cuts or cracks on her own hands with Collodion. After dressing a case she should wash her hands before touching any part of her own body or any article of food. The nurse should, of course, never use any toilet article belonging to her patient.

The Nurse's Dress.

1. *The Dress Itself.*—The dress of a nurse in a sick-room should be of a white or of a plain striped material made as plainly and as simply as possible with a pocket outside placed in a position to be accessible under the apron.

The chief points to be considered are :—

(1) The dress must be made of a material which can be washed.

(2) The fabric should be as little absorbent as possible, otherwise infective germs and unpleasant odours will cling to it.

(3) The texture of the dress should not be unpleasant to touch so as not to irritate a helpless patient in moving him.

(4) The material should be one which does not make a noise as the nurse walks about the room.

The following are unsuitable materials :—

(*a*) Woollen stuff, because it is irritating to the touch, readily absorbs germs and discharges, and cannot be frequently washed.

(*b*) Silk material, because it rustles as the nurse moves about.

(*c*) A stiffly starched cotton or print, because it makes a noise as the nurse walks about.

The following are suitable materials.—Drill, brown holland, tussore silk and cotton prints are the most serviceable materials for nursing dresses in India as they can be washed, their surface is not unpleasant to the touch, they are not noisy, and they do not readily absorb smells or microbes.

2. *The Apron.*—This should be of the usual hospital pattern with a well-fitting bib.

3. *Caps.*—These are not merely for smartness, as they keep dust from the hair and thus tend to keeping it clean.

4. *Collars and Cuffs.*—These must fit and be scrupulously clean.

5. *Shoes.*—These should not be too thin and should never have high heels which clatter over bare floors.

6. *Ornaments.*—Jewellery is forbidden in all hospitals in the interests of the patients. A brooch, belt, buckle, or a watch pinned on the breast, or pins in the dress or collar may readily scratch a helpless patient in moving him.

Rings must never be worn at work, as dirt and germs accumulate beneath them.

7. *Underclothing.*—This should consist of combinations of suitable weight to compensate for the thin dress in cold weather.

8. *Cloaks.*—The nurse, amateur or professional should always be provided with a warm cloak or wrap in case she has to run out of doors in cold weather.

The adoption of a simple uniform for trained nurses and the prohibition of jewellery are not founded therefore upon quasi-religious ideas, but are necessary for the welfare and comfort of the sick under their care.

It is for this reason that the uniform of the Nursing Divisions of the St. John Ambulance Brigade and Voluntary Aid Detachments approaches as nearly as possible to the model of the hospital nurse.

The Regulation of Visitors.

In all severe cases of illness the nurse must regulate the admission of visitors to the sick-room under the directions of the medical adviser. As a general rule the fewer visitors allowed the better, and in infectious cases it will be the nurse's duty to minimise the risk of infection as far as possible. Visitors should not be allowed to risk contact with the patient, and should wash their hands with soap and some disinfectant on leaving the room. In cases of ordinary illness the claims of relationship and friendship must be subordinate to the welfare of the patient.

A visitor should not be ushered in suddenly, especially if the meeting is likely to cause emotion, but should be ready to enter the room immediately he has been announced, as expectant waiting is sometimes upsetting to nervous patients.

The visitor should sit in full view, so that the patient can converse without having to twist his head round on the pillow. He must never sit or lean on the bed, and should make up his mind when he is going to leave—and leave. A prolonged leave-taking is very trying to a patient's temper and strength.

The patient should be watched closely after the visitor has left. During the visit the excitement and the talking may make the patient appear much better than he was before, but the result will be seen about half an hour after the departure of the visitor. If then signs of exhaustion appear the visit has not been beneficial.

Visits are most useful when patients are depressed without any special physical reason.

When there is great weakness, or where excitement induces exhaustion, some beef tea or other stimulant should be administered after the visit.

Visitors should never be permitted to interfere with a patient's meal time, or admitted at a time when the patient is settling down to sleep.

CHAPTER VII.

Nursing Helpless Patients.

WASHING, BEDMAKING, LIFTING AND CHANGING SHEETS, BED-CRADLES, AND BED-RESTS.

Washing the Patient.—It is essential that the patient be washed at least once a day so as to remove dried perspiration and allow the skin to act freely. The best time of the day to wash a patient is the early morning because (1) the patient is usually stronger early in the day, (2) as a rule the temperature is lower in the early morning.

The materials required are (1) hot water, (2) soap, (3) a piece of lint or flannel, (4) three large towels.

Sponges should not be used because, (1) they are expensive, (2) they are difficult to keep clean, (3) it is difficult to estimate the amount of water a sponge contains and a squeeze at the wrong moment may soak the bed.

The basin of warm water should not be placed *on* the bed but on a small table or chair by the side of the bed. The soap should be in a soap dish and not in the basin.

The following instructions with reference to washing

(*a*) The head and neck,
(*b*) The limbs,
(*c*) The body

should be carefully studied.

(*a*) *The Head and Neck.*—Spread a towel folded double over the pillow. Wash the face, ears and neck. The scalp may, in men, be washed two or three times a week, but when done care must be taken that the hair is thoroughly

dried. In all cases the hair should be thoroughly brushed at least once a day. In some cases it is absolutely necessary to shave the head. The beard and moustache must be washed with soap and water and combed and brushed after each meal, otherwise particles of food will accumulate in them and become offensive.

The nurse should rub one part precipitated sulphur to 10 parts of boric acid into the patient's scalp every third day. This prevents the hair from falling out when convalescence is established. If the hair of man, woman, or child, is not cut short at an early stage of a long feverish illness, such as enteric, it will certainly fall out during and after convalescence, and in the case of men the baldness is frequently permanent.

(*b*) *The Limbs.*—Only wash one limb at a time, keeping the rest of the body carefully covered up so as to avoid chills. In the case of the arm, bare it to the shoulder, spread a dry towel under it so as to prevent the bedding from getting wet, wash, dry, and cover up quickly. In washing the leg take particular care to dry the feet well, especially between the toes.

When it is necessary to pare the nails, the nails of the toes should be cut square across, and not rounded, as in the case of finger nails.

(*c*) *The Body.*—Bare the chest from neck to groin, cover the neck and upper part of the body, so as to avoid chill, and tuck a towel on both sides between the patient's body and the draw sheet, wash and dry quickly. To wash

the back the patient is rolled on one side, and the back exposed, while the limbs and front of the body are carefully covered with the bed-clothes; a towel is then pushed in between the trunk and the sheets, and the back is thoroughly washed and dried. Particular care must be taken with the skin of the back, for, in certain ailments, especially when the patient is very weak or suffering from paralysis, the skin of the back becomes irritated and inflamed, or it breaks down and bed-sores form. The most frequent site of bed-sores is over the rump bone, the hips, and the back generally. In such cases wash the back frequently with soap and water. Local massage helps to maintain a healthy condition of the skin, afterwards swab it with Spirits of wine, and dust well with boric powder. The use of boric powder dusted into the armpits and over the back and between the legs keeps the skin from developing any foul odour. The use of dusting powder should not, however, be overdone.

Changing the Night Clothes.—The best time to put on a clean night-dress or *pyjamas* is after washing the patient. It is easy enough to remove a night-dress when the patient can move freely, but when movement is limited, or impossible, it is necessary to adopt the following device. First prepare the garment by ripping up the sleeve of one side of the night-dress along the seam as far as the armpit, then carry the slit along the front over the shoulder to the neck. Open up the seam of the body of the night-dress on the same side, from the lower end upwards to the armpit, and round the shoulder seam in front. Now sew on pieces of tape at intervals on the sleeve, shoulder, and down one side so that, when it is put on, the tapes can be tied and the dress kept in its place.

To put on the garment draw on the unripped sleeve first, and then gently slip on the dress behind the patient and over her chest, without moving her, and tie the tapes.

For men, if the patient cannot be moved, the sleeping jacket should be put on back to front, whilst the *pyjamas* themselves can always be slipped on the most helpless patient.

It is always necessary to change the sleeping attire night and morning.

Cleaning the tongue is often necessary, and is done by a piece of linen wrapped round the nurse's finger and dipped in glycerine and borax or a mixture of glycerine and *nimbo* juice.

The patient's mouth and teeth require special attention in illness, and the teeth should be brushed morning and evening and the mouth washed out after each meal.

Bed-making.—The bed should, whenever possible, be made at least once every day. As previously stated, two beds are a great convenience in a sick-room. The patient should be lifted from off one bed to the other, or lifted to a couch, and carefully covered up while the bed is being "aired." Where there is only one bed a temporary "chair-bed" can be made as follows: On one side of the bed place three or four chairs side by side, with their seats towards, and their backs away from, the bed; if the level of the seat of the chair is below the level of the mattress place folded blankets or pillows so as to bring the level of the chairs up to that of the mattress; over the seats put a blanket with one side hanging over the backs; the patient may then, with or without the help of the nurse, move gradually towards the side of the bed next to the chairs and, helped by the nurse, glide on to the improvised chair-bed, when the blanket is turned from over the top of the chair backs over the patient. A pillow is placed below the patient's head and, if necessary, another blanket for warmth laid over him. The blanket s

and sheets are now removed from the bed; each blanket should be hung up, one over, say, the end of the bed, another on chairs; but they should not be thrown together in a heap, otherwise the "airing" is impeded. The mattress should then be turned over and the bed-clothes and pillows replaced. To "air" a pillow it must be shaken; seize the pillow at each end, compress it and pull the ends apart rapidly, and repeat this process again and again, imitating the action of concertina playing: the pillow is then seized by its centre, again compressed and pulled out rapidly and repeatedly; in this way the hot air is squeezed out of the pillow and cooler air sucked in, and the pillow is not only "aired," but cooled, a most comforting thing in any case of illness, especially when the patient is feverish.

Changing the Mattress.—If the mattress gets soiled and the patient cannot be removed, as in fractured spine, pelvis, or thigh, the under-sheet should be rolled up on both sides close up to the patient's body. It must then be grasped by four persons, two on either side of the bed, and the patient raised a sufficient distance off the mattress to allow of other helpers pulling it away and replacing it by a clean one.

Changing Sheets.—To change the upper sheet remove all blankets but one. On this blanket place the clean sheet covered by another blanket. The soiled upper sheet and the blanket on it are then pulled down by one hand, while with the other the nurse holds the clean sheet and blanket close up below the patient's chin and proceeds to remove the soiled sheet with its blanket from over the patient's feet.

To change the under-sheet undo the sheet from beneath the mattress, top, bottom, and sides. Then roll the clean sheet lengthwise to half its breadth. Now turn the patient on one side without removing the bed-clothes, and roll up the soiled sheet on the side away from which the patient

has been turned as far as the body will allow. Remove the pillows and then place the rolled clean sheet on the side of the bed where the mattress is uncovered and tuck the

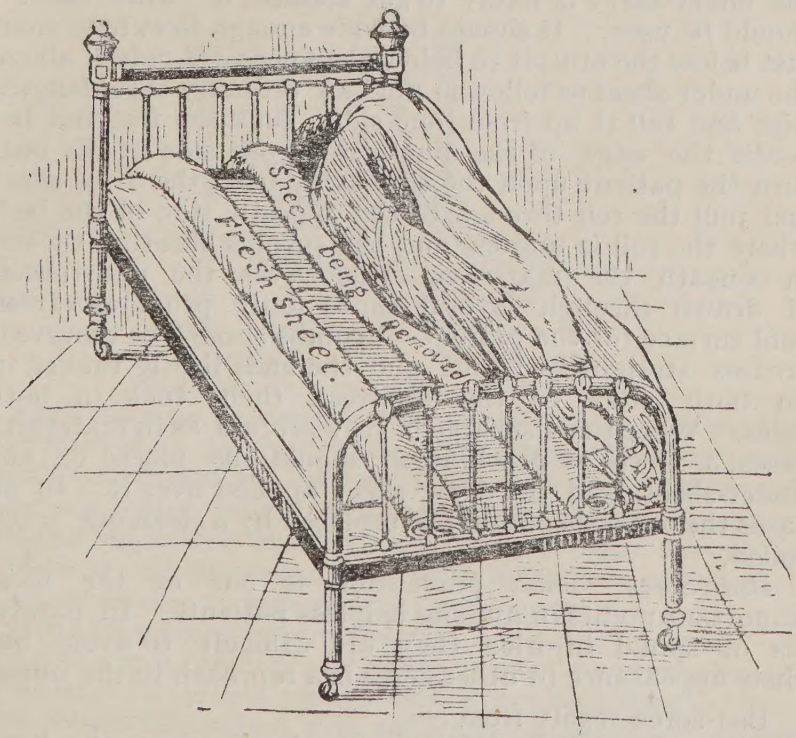

Fig. No. 5. Changing the Undersheet.

edge of it firmly under the mattress. The patient is now turned on his back and rolled on to the clean sheet. *See* Fig. No. 5. Remove the soiled sheet and spread the clean one over the mattress and tuck it in at the top, bottom, and sides.

If the patient cannot be turned on his side roll the clean sheet breadthwise and slip it under the feet. Roll up the soiled sheet and, lifting the feet, legs, hips, shoulder

and head, unroll the clean and, roll up the dirty sheet from below upwards.

Draw Sheet.—When there is much perspiration, or when the under-sheet is likely to get stained, a "draw sheet" should be used. It should be wide enough to extend from just below the armpit to below the knees. Apply it above the under-sheet as follows : Fold an ordinary sheet lengthwise and roll it up from one side, tuck the free end beneath the edge of the mattress on one side of the bed, turn the patient upon the side away from the draw sheet and pull the roll through to the opposite side of the bed, where the roll is undone and the surplus sheeting tucked in beneath the mattress. This saves the undersheet. If drawn through several times daily provides a fresh cool surface for the patient. Crumbs should be removed, creases straightened out and the ends firmly tucked in on both sides of the mattress, then tuck in both sides. When the discharge is very profuse, as in maternity cases, a piece of mackintosh should be placed on the under-sheet, and the draw sheet applied over it. In all cases the draw sheet must be replaced by a clean one when soiled.

Bed Sores.—Their prevention is one of the most important points in nursing helpless patients. In paralysis or spinal injuries they are difficult to avoid, but their appearance in other cases is a reproach to the nurse.

Bed-sores result from :—

(*a*) Contiuious pressure on places where the bone is close under the skin.
(*b*) Friction.
(*c*) Moisture.
(*d*) Creases in the under-sheet or night attire.
(*e*) Crumbs in the bed.
(*a*) Bed-sores due to pressure occur most frequently on the hips, the lower part of the back, the shoulders, and the heels.

(*b*) Those from friction appear on the ankles, the inner surface of the knees, on the elbows, and back of the head.

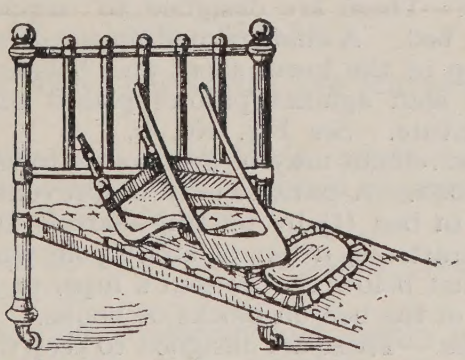

Fig. No. 6. Improvised Bed Rest.

They may be prevented by: (1) absolute cleanliness, (2) removal of pressure, and (3) dryness. The back and shoulders should be washed with soap and water and carefully dried night and morning. After washing, methylated spirit, brandy, or eau-de-Cologne should be rubbed in and the skin dusted with a mixture of one part of oxide of zinc to four parts of boric powder.

Patients who are incontinent in habits as a result of Paralysis or a low state of health require frequent change of linen. In serious cases about every four hours. The skin should be washed with soap and water then rubbed vigorously with a preparation consisting of Olive Oil and Spirits of Wine equal parts. The oil helps to nourish and lubricate the skin.

Water, air-beds, rubber ring-cushions, and ring-pads are of the greatest possible value in preventing bed-sores. The knees, ankles, and elbows may be protected by a thick layer of cotton-wool firmly secured by a bandage. When possible, a patient should never be allowed to lie more than two hours in one position. He should be

turned first on one side and then on the other, and kept there by an arrangement of pillows.

Any redness over prominent bony parts should be at once reported to the surgeon.

Bed Rests.—These are designed to support a patient sitting up in bed. A chair turned upside down and placed upon the top of the lower sheet and bolster, so that the patient can lean against pillows placed on it, forms a useful substitute. *See* Fig. No. 6.

Help in movement may be got from a towel fixed to the foot of the bed. A patient may be prevented from slipping down in bed (1) by putting across the bedstead, under the mattress, a bar or short pole which will raise the latter just below the patient's hips, or (2) by tilting up the foot of the bed on blocks or books.

Bed Cradles.—These are designed to keep the bed-clothes from pressing on an injured leg. An empty whisky or wine box with the ends taken away, or a kerosene oil tin with the top and one side removed, are articles always obtainable in India well adapted for use as cradles. *See* Fig. No. 7.

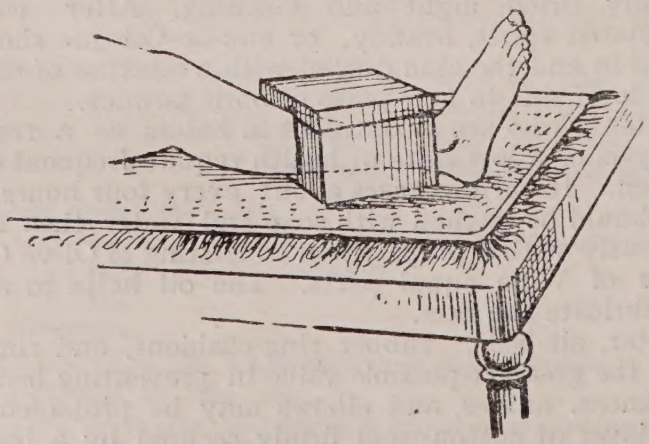

Fig. No. 7. Improvised Cradle.
Note.—The box should have been drawn much larger.

CHAPTER VIII.

Sick Dietary.

Foods come under one of the five following headings, namely :—

1. Nitrogenous or meat foods, which include eggs, fish, flesh, and fowl, and also certain vegetables, such as peas, beans, and lentils.

2. Fatty foods, which include butter, cream, and the fats of all animals.

3. Carbohydrate or starchy and sugary foods, which include rice, tapioca, sago, potatoes, and all similar foodstuffs. Bread is a starchy food, but when stale, toasted, or in the form of crust the starch is in a different form to that in most other starchy foods; bread also contains a small amount of nitrogen and fat.

4. Mineral foods, including common salt, phosphates and carbonates.

5. Last, but not least, water, which, next to air, is the prime necessity of life.

In addition to these five essentials there is an important group of articles, such as tea, coffee, and condiments which are known under the comprehensive title of food accessories.

Putting on one side *air* and *water*, in a sufficient diet there must be : (1) A *protein constituent*—that is, a food containing nitrogen—because nitrogenous or albuminous tissues form the essential framework of the body. (2) There must also be *salts*, because these enter into the composition of all the tissues and fluids. (3) Although fat can be formed in the body from proteins

such is not its usual mode of origin, neither could the whole quantity of fat that is required be obtained from this source, therefore *either a fat or carbo-hydrate* must be present in the food.

Age, sex, climate, season, and personal peculiarity all exert a marked influence upon dietetic requirements.

Fifty to eighty ounces of water are taken in all kinds of dietaries, European and Indian. A man consumes daily about a one-hundredth part of his weight of dry solid food and three-hundredth parts of his weight of water.

Let us consider briefly the chief characteristic articles of dietary :—

Nitrogenous Foods.

Meat.—Meat may be divided into two classes—red and white. Of the *red* meats beef, mutton, and pork are examples, whilst the flesh of fowls and turkeys constitute the *white* meats. The latter are, as a rule, more digestible than the former. They contain, however, less nitrogen, and are therefore somewhat less nutritious.

Fish.—Compared with butchers' meat, fish contains more water, less fat, and less extractives.

There is a popular delusion to the effect that fish is specially valuable as a "brain food."

The opinion is grounded on the belief that fish is specially rich in phosphorus, and that mental processes are dependent upon a full supply of this substance. There is, however, no justification for the statement either that fish is rich in phosphorus or that phosphorus, is specially good for the brain.

Fish is so liable to be tainted in India that it should be given to invalids with caution.

Eggs.—Eggs constitute one of the best forms of nitrogenous food. The white part consists of what is known as albumen, and a good deal of water. It is very digestible when raw or lightly cooked, but less so when the egg is hard boiled. The yellow part, or the yolk, contains fatty matter and phosphates. Eggs contain everything essential for the support of life except starch and sugar.

Milk.—Milk for invalids is derived in by far greatest quantity from the cow. The buffalo, goat and ewe yield milks which differ more or less in their composition from that of the cow, but the main characters of milk are the same in all mammals.

Milk is most important as an article of food because it contains all the necessary food principles in a readily digestible form. Intended for the nutrition of the rapidly growing young animal, it contains a very large proportion of water, and a relatively large proportion of fat and protein in comparison with the carbo-hydrate constituent. It is not therefore a food suitable for the entire nutrition of the adult, but for the infant it is essential, whilst for the growing boys and girls invalid and the elderly it is most valuable. One pint of average good milk contains about 2½ ounces of water-free food. whilst one pound of meat contains about 4 ounces, but not all of this is perfectly digestible, as is the case with the whole of the solids of milks.

As a rule, milk should be boiled or pasteurised before use. Boiled milk is more digestible than fresh, and is very little, if at all, less nutritious as an article for invalid dietary.

Skim milk and whey are nourishing, easy of assimilation and agreeable articles of food for invalids.

Fats.

Butter :—Good butter should be of a yellow colour, which deepens with the richness of the pasture. Cows kept in the house on hay or dry food give an inferior product, whilst buffalo cream always yields a dead white butter. Various substances are added to increase, or produce, the popular colour.

As an article of food, butter furnishes invalids with the principal part of their fatty food : it is extremely palatable and digestible when fresh and of good quality.

Ghee, or clarified butter, takes the place of butter in the dietary of most Indians. It is a wholesome and nutritious fat, but the peculiar flavour does not appeal to Europeans.

The Vegetable Foods.

The following are the vegetable foods used in invalid dietary.

1. *Bread.*—This can be manufactured in a variety of ways, but all methods aim at the aeration of a mixture of flour and water and subsequent cooking at a temperature of about 460° F.

A good sample of bread should be light and spongy, the crumb being well permeated with little cavities. It should not be either acid to the taste, bitter, or moist. When set aside, the lower part should not become sodden.

2. *Oatmeal.*—Oatmeal is the most nutritious of all cereals. It is very rich in fat. Oats prepared by rolling instead of grinding and heated during the rolling process, are much more digestible and easily cooked than ordinary oatmeal. Prepared in this way, the cereal constitutes the preparation of oats, largely advertised under various fancy names, which are so deservedly popular.

Gruel is prepared by boiling oatmeal in water or milk, and *porridge* is made by stirring the meal into boiling water and cooking until the compound becomes of the consistency of pudding.

Cornflour is prepared from maize and wheat by washing away the protein and fat by means of dilute alkaline solutions, so that little but starch is left.

Rice.—This is the poorest of all cereals in protein fat and mineral matter. On the other hand, it has fully 76 per cent. of starch. The starch has the further advantage of being present in small and easily digested grains. When boiled, rice swells up and absorbs nearly five times its weight in water, while some of its mineral constituents are lost by solution. It is preferable, therefore, to cook it by steaming.

The nutritive value of rice is much impaired by its poverty in protein and fat. Hence it is not adapted to be an exclusive diet, but should be eaten with other substances rich in these two elements, such as eggs or milk.

5. *Potatoes* consist of sugar, starch, and a trace of protein. When well cooked they are easily digested. The salts found in the juice of potatoes are a complete preventive against scurvy.

6. *Green vegetables* consist of large quantities of water, much cellulose of fibre, and small quantities of sugar, gums, and allied bodies. The members of this group are chiefly valuable as flavouring agents, antiscorbutics, and natural stimulants to the action of the bowels. They have little or no nutritive value.

7. *The succulent fruits* have low nutritive value, but are rich in vegetable salts; they are antiscorbutics of incalculable value.

Mastication or Chewing.

The saliva, or spittle, has a digestive action on bread and starchy foods, but in order that it may be enabled to do its work the food must not only be chewed, but must be kept for a while in the mouth. Soft invalid foods especially require to be acted on by the saliva, and therefore, bread and milk, rice, tapioca, puddings, etc., although not requiring chewing to enable them to be swallowed must remain for a sufficient time in the mouth. When the saliva is swallowed and reaches the stomach its powers of digestion are soon destroyed.

Sick Room Cookery.

The objects of cooking food are twofold :—

1. *Aesthetic.*—To improve its appearance and to develop in it new flavours.

2. *Hygienic.*—To sterilise the food to some extent and to enable it to keep longer.

It is an error to suppose that cooking increases the digestibility of food. This is only true with regard to vegetable foods. The digestibility of meat is diminished by cooking, although the increased attractiveness of cooked meat may render it indirectly more capable of digestion by calling forth a more profuse flow of digestive juices.

The processes of cooking employed are boiling, roasting, baking, stewing, broiling, and frying.

(*a*) *Boiling.*—To retain the nutritious matters, the flesh in bulk is plunged into boiling water, and in a few minutes the external albuminous layer is coagulated. The temperature is then allowed to fall to about 160° Fahrenheit, and the cooking continued. To extract the nutritive matters, the flesh is cut into small pieces, placed in cold water, and gradually heated up; if it is desire

to extract the gelatine, as for soups, it is heated to boiling point and kept simmering.

(*b*) *Roasting.*—The principle of coagulating the outside albumen referred to above applies to roasting, when the flesh is first placed close to an open fire, and then removed a little further dway.

(*c*) *Baking* is similar to roasting. As, however, it is carried out in a closed oven the pleasant smelling products, analogous to the caramel produced by burning sugar, which are developed by the action of heat on flesh, are not formed to the same extent as in roasting.

(*b*) *Stewing* is slow cooking, with or without a little water, the temperature being kept well below boiling point. A simmering temperature is too hot for stewing, Simmering is only another word for boiling when, of course, the water reaches 212° Fahrenheit. In stewing the temperature should be only 180° or thereabouts.

(*e*) *Broiling* is the term used when the process of roasting is carried out quickly on a gridiron.

(*f*) *Frying* should mean boiling quickly and evenly in oil, instead of water.

The essence of frying consists in the sudden exposure of the food to a very high temperature.

The fish or other substance should be practically cooked throughout its substance almost instantaneously.

It will be observed that this process differs entirely from the so-called "frying," in which the fat is employed merely as a means of preventing the object from adhering to the surface of a shallow pan in which a sort of roasting is really accomplished.

The following points require special attention :—

1. *Cleanliness.*—This point, admirable in all cookery, is especially necessary when providing for the sick. The food must be served in a cleanly and attractive way, and a soiled glass or sloppy saucer should never be offered to an invalid. Everything should look neat and tempting —the tray cloth must be clean, and the silver and cutlery must be bright.

2. *Quantity.*—Small quantities only of all foods should be prepared and served. The sight of a large bowl of beef tea may destroy all appetite, while a small cupful would be welcome.

3. *Readiness.*—Food should always be in readiness. The wish for food often passes away if it has to be prepared.

4. *Storage.*—Food must never be left in the sick-room. It should be brought at the prescribed time, and immediately removed if not eaten. Drinking water should be kept outside the sick-room, otherwise it will absorb microbes from the air.

5. *Administration.*—When food is prescribed at short intervals, the patient should be wakened, for loss of strength continues during sleep.

It often happens that patients are unable to eat solid food the first thing in the morning, and yet if food is not taken, the ability to take it will decrease. In such cases a little liquid food prepares the way for a more solid meal.

The Indian *chota hazri* (or little breakfast) prevents fatigue being felt in a person not "up to the mark," and so enables him or her to enjoy breakfast.

6. *Preparation.*—All cooking must be done outside the sick room.

If the amount of liquid to be taken is limited, the exact quantity should be measured out, as many patients, and especially children, dislike being stopped in the middle of a drink. It is well to remember that the smaller the glass the larger the drink appears to be.

In raising a patient to drink, the hand should be passed behind the pillow to support both the head and shoulders. If the neck is too much bent, swallowing will be difficult. If the head is not lifted straight, the fluid will escape at the corners of the mouth.

Every house should contain a feeding cup. When one is not to hand a small afternoon teapot makes a fair substitute.

CHAPTER IX.

Stimulants and Other Beverages.

A certain amount of alcohol may be safely consumed as a heat-producing food. This amount is certainly limited—not more than one, or at the outside two, ounces in twenty-four hours. When, for some reason, insufficient food is taken, alcohol is often useful, but when sufficient food is taken it is unnecessary.

Alcohol is a drug, and should be ordered by the doctor as a part of a patient's treatment. A nurse who would not dream of dosing her patient with drugs on her own responsibility should similarly never take upon herself to administer brandy. Except in cases of extreme urgency it should not be given without the doctor's order—such an exception would be cases of drowning or sudden collapse in a heart case, where death seems to be imminent. When brandy is ordered the nurse must not exceed the prescribed quantity. There is no reason, because brandy has once been ordered, that the patient should go on taking it after the necessity has ceased during convalescence.

Alcohol is *not given in cases of hæmorrhage* for if the heart is stimulated the blood circulates more rapidly, and the hæmorrhage increases. The first remedy that occurs to the mind of anyone who sees a person in an unconscious condition, or in a fit, is probably brandy; but if the unconsciousness is a consequence of cerebral hæmorrhage, or of a dozen other causes, the brandy will do harm.

When brandy is given as a stimulant it must not be too much diluted; it is enough to add two parts of water to one of brandy, except in the case of children when five

or six parts of water must be added. The brandy must be given frequently for the stimulating effect soon passes off and depression follows and, as it has to be given often, it must be given in small doses. The average amount given to a patient is three ounces in twenty-four hours, and this quantity is divided up according to the state of weakness or collapse of the patient.

Three ounces are equal to twenty-four drachms, therefore the nurse should give one drachm every hour throughout the day and night, if necessary, or two drachms every two hours, and so on, but in ordinary cases half an ounce every four hours is a convenient method of administration. The doctor invariably settles the amount of stimulant to be taken, and he should be asked to fix the times for taking it. Wine should, as a rule, be given with meals, but if wanted between meals it is a good plan to beat it up thoroughly with the yolk of an egg. Four or six ounces of port wine daily is the quantity usually ordered, and it should be given two ounces at a time. Egg and brandy mixture is sometimes used for patients who take their food badly.

Alcohol may be prescribed in large doses in pneumonia, which is a short acute illness; but in such diseases as typhoid which certainly lasts three weeks, and may last twice as many months, brandy is given at first in very small doses, if it is ordered at all, usually one or two ounces in twenty-four hours, increased as the symptoms point to it, until at the height of the illness six or eight ounces are given. More than this is seldom ordered.

Champagne is given one ounce at a time. every two or three hours, or oftener, according to the gravity of the case.

The nurse must notice the effect of the alcohol on the patient's temperature and pulse, and if it produces sleep or quiets delirium.

Tea and Coffee.—Tea was evidently introduced owing to the calamities arising from drinking unboiled water. Experience dictated the necessity of boiling water to tropical residents. But, boiled water being insipid, and the object of its being boiled not being evident to ignorant and thoughtless people, the water was "flavoured" by the leaves of the tea plant, a custom which has now become almost universal.

Tea and coffee contain active principles which are stimulants to the nervous system. They act on the heart, in small doses, as a tonic, but in excessive, or too frequent doses, they make its action irregular and weak. Excessive tea drinking often makes a person nervous and irritable.

Cocoa and Coca.—Cocoa is a wholesome and palatable beverage much appreciated by invalids, but condemnation cannot be too strong in regard to the use of the drugs, *coca and kola,* in the various tonic wines. These drugs contain stimulating alkaloids, whose action on the system is insidious, and a craving is often set up that leads to a form of insanity known as cocainomania. Unhappily, this is increasing in the tropics, and India especially, at the present day. Such drugs should only be taken under constant medical supervision.

Aerated Waters.—These consist of water, or solution of salts, with or without sugar and flavouring agents, aerated with carbonic acid gas. Carbonic acid gives a brightness to water which is much appreciated by invalids, and aerated water often makes milk more palatable.

CHAPTER X.

Medicines and Their Administration.

The administration of medicine demands tact from the nurse in a high degree, as from the very fact that a substance is called a "medicine" it is apt to be resented by a certain class of patients.

Measuring Medicines.—Medicines have to be measured not only by the pharmacist who makes up the prescription, but also by the nurse who administers it, and she must be thoroughly acquainted with the various measurements.

The chief weights in use in medicine are the minim, the drachm, the ounce, the pint, and the gallon, and their domestic equivalents as shown in the following table.

The minim is the medicinal drop: but a drop varies in size according to the nature of the fluid: thus a drop of water or spirits of wine is much smaller than a drop of castor or olive oil. Domestic measures are still generally used by doctors in their directions on prescriptions, but spoons and wine glasses differ so enormously in size that it is difficult to understand why this custom survives. A nurse should always use a graduated measure glass in administering fluid medicines.

The following table shows the common domestic measures with their Imperial standard equivalents:—

Table of Imperial Measures and their Approximate Domestic Equivalents.

Imperial Measure.	Domestic Measure.
1 minim equals	.. 1 drop.
60 minims equal	.. 1 drachm.
2 drachms ,,	.. 1 dessert spoonful.
8 drachms ,,	.. 1 ounce.

Imperial Measure.		Domestic Measure.
16 ounces	equal	.. 1 pound.
20 ounces	,,	.. 1 pint.
2 ounces	,,	.. 1 wineglassful.
1 pint	equals	.. 1 peg tumblerful.
2 pints	equal	.. 1 quart.
4 quarts	,,	.. 1 gallon.
5 ounces	,,	.. 1 tea-cupful.
8 ounces	,,	.. 1 breakfast-cupful.
10 ounces	,,	.. 1 small tumblerful.

Tea-cups, of course, vary much in size. The ordinary British or Japanese tea-cup, as usually filled at meals, contains about the quantity stated in the above table. A sherry glass contains approximately 2½ ounces, a port glass 3 ounces and a claret glass 5 ounces.

The following approximate weights of articles in common use may be useful in the jungle when weights and measures are not available.

(1) A tablespoonful of kitchen salt weighs about half an ounce. A pinch of salt, or as much as will stand heaped up on a four-anna piece, weighs about five grains.

(2) A large lump of sugar weighs about a quarter of an ounce. A tablespoonful of castor sugar weighs about one ounce.

(3) A tablespoonful of rice weighs about one ounce. Medicines for internal use are dispensed either as :—

1. Mixtures.
2. Pills.
3. Powders.
4. Tablets.
5. Cachets.
6. Oils.
7. Suppositories.

1. *Mixtures.*—Mixtures are medicines of various kinds blended in a liquid form. They should be kept in a cool place, well corked, and out of the reach of children. The doses must be given at the prescribed intervals. A mixture ordered every four hours should be given by night as well as by day, but the patient should not be disturbed if asleep unless so ordered by the doctor. If a dose has been omitted or put off, do not give an extra quantity within a shorter time to make up. Never give medicines in the dark, and always look at the labels, even if giving the same medicines several times a day. No medicines should ever be given immediately before breakfast unless by the orders of the doctor.

Sleeping draughts should never be kept with other medicines. Brandy and other alcoholic stimulants should, as pointed out in the last chapter, always be regarded as medicines.

All applications intended for outward use, such as liniments, must be kept in a different place from internal medicines and should be in bottles different in both appearance and touch to ordinary ones.

2. *Pills.*—The best method of administration is to put the pill at the back of the tongue and wash it down with a large mouthful of water.

3. *Powders :*—Most powders, if allowed to stand in water for a considerable time, sink and become suspended in the water instead of floating upon it, and in this way may readily be swallowed. Gregory's powder, which is especially nauseous to most people should be placed in a wineglassful of water for some hours before it has to be taken. When thoroughly soaked, it should be transferred from the glass to a tablespoon with water ; it can then be readily swallowed.

4. *Tablets.*—These should be given like pills.

5. *Cachets.*—Cachets should be thoroughly soaked on both sides and floated on the water in a tablespoon. They may then be readily swallowed. They must not be placed dry on the tongue and an attempt made to wash them down with water, as if this plan is attempted they readily burst.

6. *Oils.*—Castor oil is frequently looked upon with abhorrence by otherwise good patients, but as it is an absolutely essential drug in many ailments the nurse must know the following simple expedient for giving it without it being tasted :—Squeeze the juice of half a lemon into a small wineglass. Swill the juice round so that the glass is completely moistened and pour the prescribed quantity of oil on to the centre of the lemon juice and wipe the rim of the glass with the squeezed half of the lemon. The patient then swallows the contents of the glass like an oyster. It will be found that the flavour of the lemon juice completely masks the nauseous taste of the oil.

7. *Suppositories.*—These are small cones of cocoa butter, about one inch in length and about a quarter inch in breadth containing various drugs. The conical point is held against the aperture of the anus, and gently pushed into the lower bowel. In the interior the suppository melts and the drugs it contains are set free and absorbed.

The medicines for local use are as follows :—

1. Ointments.
2. Liniments or Embrocations.
3. Lotions.
4. Gargles.
5. Eyewashes.
6. Plasters.

1. *Ointments or Salves.*—Some ointments are applied merely as remedies for skin affections, others, such as blue ointment, have to be rubbed in so that the drug which they contain—usually mercury—may be absorbed through the skin into the blood and tissues.

2. *Liniments.*—These are spirituous or oily fluids, which are sometimes painted on the skin, but more commonly used for rubbing. In the latter case, a little should be put in the palm of the hand, and the affected part rubbed firmly, but not so hard as to cause pain or bruising. In a limb, always rub upwards towards the shoulder or hip, and do not rub where the bones are just under the skin, as, for instance, the shin. The hand must be carefully washed afterwards.

3. *Lotions.*—Lotions are watery fluids either applied on lint or used for dabbing on a painful part. If a cooling or evaporating lotion is used the material on which it is applied must be thin and used only in a single thickness. It should be exposed to the air, and, as it dries, more lotion should be sprinkled on it, or the lint changed for a second piece, which should be kept ready for use soaking in the lotion.

4. *Gargles.*—These are solutions of drugs used as remedies for sore throat. Their efficiency depends on the patient. They cannot be used by children.

5. *Eye washes.*—Lotion can be best applied to the eyes by an eye-bath obtained from a chemist, but a small wineglass or an egg-cup may be used instead. Some lotion is put in the cup, the edge fitted round the eye, and the head thrown back, so that the lotion runs over the eye, which should be opened. If the eyes are to be merely bathed, some lotion should be poured into a perfectly clean saucer, and after the hands are thoroughly

washed small pieces of clean rag or lint used for bathing. The lint or rag must not be used a second time unless it has been boiled.

6. *Plasters.*—These were at one time popular remedies with the medical profession, but are now rarely prescribed. Various kinds of plasters, "poor man's plaster" and "warming plaster," have still a great vogue with a certain section of society. They cannot be used by people who have a bath every day, as, when applied they are not removed until they come off of their own account. Belladonna plasters are still ordered to stop the secretion of milk in the female breast, but most doctors now paint on glycerine of belladonna and cover the part with lint and a protective tissue such as oiled silk.

Purgatives.

The great group of aperient medicines deserves special mention.

Purgatives may be given as :—

(1) Pills.
(2) Powders.
(3) Salts, including Seidlitz Powders.
(4) Mixtures.

Pills and powders are generally slowly-acting medicines and given at bedtime. The salts, such as Epsom salts, Carlsbad, aperient waters, etc., act rapidly and are as a rule administered in the early morning. They are rendered more speedy in their action if a glass of hot water of a cup of tea is taken from half an hour to an hour after them. Purgatives should not, as a rule, be given during the day, as they may interfere with the patient's meals.

The Dilution of Medicine.

The dilution of medicines should be done in accordance with the doctor's directions. Nurses frequently attach undue importance to it, as the amount of water added to a drug taken internally will usually make little or no difference to its action.

The water used for diluting medicines should be of unquestionable purity or carefully boiled.

The Time to Give Medicines.

There is a right and wrong time for giving medicines.

The "three-times-a-day" medicines are best given at ten, two and six, during the day only, and the four-hour medicines at the same hours, *day and night.* Medicines taken four times a day are best given at ten, two, six and at bedtime. Six-hourly medicines are best given at twelve and six, and the three-hourly medicines at three, six, nine and twelve, day and night.

Medicines ordered before food should be given a quarter of an hour before the three principal meals of the day, and after-food medicines as soon as possible after the same meals.

Many medicines are ordered after food. Cod Liver Oil, iron, and arsenical preparations are always given at this period, as a matter of routine. Medicines given before food are chiefly bitters and alkalis, such as bicarbonate of soda, which are ordered to improve the appetite.

Always shake the bottle before pouring out a dose of any mixture, as even although it looks quite clear it may contain heavy liquid ingredients such as glycerine or syrup which sink to the bottom of the bottle, or very light and volatile ones such as spirituous preparations and

prussic acid which float on the top of the fluid. Some mixtures containing bismuth and other insoluble powders need a great deal of shaking and should be drunk directly they are poured out, before the powder has had time to settle at the bottom of the glass.

CHAPTER XI.

Observation of the Sick.

The correct observation of the sick person is the most important part of a nurse's duty, and on the accuracy and intelligence with which she makes her reports to the doctor depends in no small degree the patient's prospect of recovery. The doctor can only remain a very short time by the patient's bedside and he must, therefore, however clever and observant he is himself, base his treatment very largely on the nursing reports.

Careless or inaccurate reports may mislead the physician and kill the patient.

The nurse has to observe and report on the following fourteen points :—

1. Temperature and Pulse.
2. Rigors.
3. Sleep.
4. Pain.
5. Posture.
6. The Skin.
7. The Tongue.
8. Appetite and Thirst.
9. Vomiting.
10. The respiration, cough and expectoration.
11. The bowels.
12. The urine.
13. The effects of remedies.
14. The mental state.

Of course it will not be necessary to note on them in all cases, but the headings should always be borne in mind when writing a nursing report.

1. *The Temperature and Pulse.*—These are so important that they are given the next chapter to themselves.

2. *Rigors.*—These are simply shivering fits. They are serious and important signs, as many bad illnesses commence with shivering and a sense of chill. When rigors occur in the course of an acute illness or after an operation they are usually a sign of the formation of matter or pus. The nurse should carefully note down when the shivering fits, or rigors, came on, how often they occurred how long they lasted, and their severity. The latter varies greatly, sometimes there is only a feeling of chill down the middle of the back, whilst at others the attack is of such violence that the shivering makes the teeth chatter and even the whole bed shake. In a serious case, if a rigor occurs, the doctor should be communicated with. The nurse should take the temperature when rigors take place as they generally are a symptom of fever, not of cold, and are caused by disturbances of the nervous system. Rigors are very common in malarial fevers, indeed the term "ague" is often used in the Tropics to denote a rigor.

3. *Sleep.*—The kind and quantity of sleep should be carefully observed. The notes should show, for instance, if the patient (*a*) fell asleep quietly at the usual hour, (*b*) passed a wakeful night, (*c*) fell into a heavy slumber towards morning, (*d*) whether he started up during sleep, (*e*) twitched at the bed clothes, muttered or was delirious, or (*f*) if he slept heavily and snored.

All these points must be carefully noted, and also the total amount of sleep obtained.

4. *Pain.*—Any pain or peculiar sensation of any kind of which the patient may complain must always be reported to the doctor, the time when it occurred, where

it was felt, how long it lasted and how the patient described it. No doubt sick people are often what is called "full of fancies," nevertheless, anything of which they complain should always be reported to the doctor as he will know best if it was "fancied" or not. The nurse must not take upon herself to decide whether the patient's complaints are fanciful or real. She washes her hands of responsibility when she tells the doctor exactly what the patient has complained about.

5. *The position of the patient.*—The position which the patient takes of his own accord is, in severe illness, very useful to note. In the course of many fevers, when a patient has been for some days persistently lying on his back and all at once turns over to his side, there is often good ground for regarding it as the first sign of improvement.

If a patient persists in lying on his back with the knees drawn up and fears even to let the bed clothes touch his stomach, it generally is a sign of the existence of peritonitis or inflammation of the thin membrane that covers the bowels.

6. *The Skin.*—The nurse should note if the skin is dry and burning or moist, if there is much perspiration or sweating, and at what hour such sweating occurs. Also if there is any rash, eruption, or unusual redness on any part of the body.

Any unusual colour of the skin, swelling, or blotches, which the nurse may perceive whilst washing the patient should always be reported to the doctor.

Any alteration in the colour or expression of the patient's face should be taken note of in illness, and always mentioned to the doctor.

Discharges of any kind from the eye, nose, or elsewhere, should also be brought to the doctor's notice. The nurse should observe the colour, consistency and quantity of all such discharges.

When nursing women, it is always very important that the nurse should make a report with reference to the monthly periods, when they come on during illness. She should inform the doctor if they are normal, excessive or scanty, and especially, note if the colour is normal or otherwise.

7. *The Tongue.*—The appearance of the tongue varies greatly. It may be (1) bright red as in sprue, (2) furred as in all febrile states, (3) swollen, (4) protruded with difficulty as in apoplexy, (5) protruded to one side as in some forms of paralysis, (6) tremulous as in alcoholism, (7) dry or moist. It should always be inspected before food and its appearance carefully described in the nurse's report.

8. *Appetite and Thirst.*—Hunger is caused by deficiency of food, thirst by a peculiar state of the mucous membrane, chiefly that of the mouth.

Appetite is nearly always diminished in acute diseases, but thirst is usually increased.

The nurse must carefully note (1) the total amount of food and drink taken during her tour of duty, (2) the quantities of each article of food and drink and the hour at which they were administered, (3) any special remarks as to whether they were followed by pain, evacuation, or vomiting, (4) if the food or drink was relished, and (5) any request of the patient for special articles of food or drink.

9. *Vomiting.*—The points to be noted if the patient should suffer from vomiting are ; (1) when it took place, (2) the colour and appearance of the vomited matter when it was brought up, (3) whether the vomiting

was accompanied by pain, and (4) whether there was much stretching or straining. The nurse must remember, if possible, to keep the vomit for the doctor to inspect.

10. *Respiration : Cough and Expectoration.*—It is often necessary for the nurse to count the respirations. She should remember that a healthy adult breathes about 17 times a minute. If the patient notices that you are counting his breathing, he will quicken it involuntarily, so the operation of counting must be performed without his knowledge. The respirations of a child are much more frequent than those of an adult, and can readily be counted by placing the hand on the abdomen.

Cough is usually caused either by phlegm in the bronchial tubes which requires removal, or by irritation of the throat and air tubes.

The nurse must note the following points with reference to a cough :—

1. Its frequency.
2. If caused by change of position.
3. Its characters. It may be : (*a*) dry in early bronchitis, (*b*) soft in late bronchitis, (*c*) hacking in early consumption, (*d*) deep and distressing in late consumption, (*e*) short and sharp in pneumonia, (*f*) crowing in croup, and (*g*) whooping in whooping-cough.
4. If phlegm is brought up as the result of the cough.

The expectoration is the phlegm or material brought up by the cough. It may be :—(*a*) *mucous, i.e.*, the ordinary secretion increased as in bronchitis, (*b*) *purulent, i.e.*, containing pus, or matter, as in late and chronic bronchitis, (*c*) *bloody* as in consumption and pneumonia.

The nurse must note the quantity, the manner in which it is brought up, its appearance, colour, and if it sinks in water.

If the colour is rusty brown it is a sign of inflammation of the lungs. It is frothy in pleurisy, in bronchitis it is extremely sticky, so that in some cases it adheres like glue to the sides of the vessel. In chronic bronchitis it is thick and yellow. In consumption, inflammation of the lungs, and sometimes in heart disease, the phlegm is streaked with blood. If the expectoration has a bad smell it is a serious symptom.

All expectorations should be received in a disinfecting fluid, in a spit-cup which can be readily improvised from a jam jar or similar receptacle.

The vessel into which the phlegm is received should never be allowed to lie by the patient many hours unemptied. There should be two such receptacles so that they may be constantly removed and washed out thoroughly. The one used at night should be taken away early in the morning, and kept covered up for the doctor to see.

11. *The Bowels.*—The nurse must inspect the bed-pan or commode after use so as to know if the bowels act regularly, are constipated or loose. If there is diarrhœa, the nurse must note how many times the bowels have operated since the doctor's last visit, and whether there has been pain. The colour and nature of the motions must be reported, and it must be specially noticed if blood has been passed. When the stool is kept for the doctor, the utensil must be closely covered with a cloth soaked in a disinfectant and kept in the bath room.

12. *The Urine.*—In all cases of illness the nurse should be able to tell the doctor (1) the colour of the urine, (2) if a sediment gathers when it has stood for some time (3) if it has any peculiar smell, (4) the frequency with which it is passed, and (5) if there is any pain in doing so.

When urine is sent to the doctor for analysis it must be sent in a perfectly clean bottle and carefully labelled.

It is an important piece of the nurse's work in serious illness to note if the patient passes water regularly or not. In some diseases the secretion of urine ceases, a very serious symptom, to which it is urgently necessary to call the doctor's attention. People who are paralysed or unconscious may cease to feel any necessity for passing water, even though the bladder be distended. After confinement, and some operations many people suffer for a few hours or days from a slight paralysis of the bladder, which entirely prevents them from passing water naturally. Any delay, therefore, in this matter beyond a few hours must always be at once mentioned to the doctor, for if this state of things is not soon remedied it may be very injurious. The water is drawn off by a little instrument called the catheter.

When patients have sweated profusely, the urine will probably be scanty and high coloured for some little time.

13. *The Effect of Remedies.*—Medicines may be given to produce sweating, to act as aperients, to check diarrhœa and many other purposes, and the nurse should ascertain from the doctor if she is to look for any particular result from the medicine he orders and keep him informed as to whether these results have been what he wishes or not.

Some poisonous drugs are liable to cause serious results in quite small doses in people who have a natural susceptibility to the poison, for instance :—

Strychnine may cause sleeplessness, stiffening and twitching of muscles.

Arsenic may cause pain in the abdomen and sore eyes.

Quinine may cause headache, deafness and noises in the ears.

Mercury may cause a profuse flow of the saliva, bad breath, and soreness of the mouth.

Belladonna may cause dryness of the throat, a red rash, and dilated pupils.

Opium may cause stupor and contraction of the pupils.

14. *The Mental State.*—It is always very important for the nurse to mention to the doctor anything unusual in the temper or state of mind of the patient, such as irritability, wandering talk, muttering and such like.

Twitching or unusual movements in the face, head or limbs, in fact, every little thing that is in the least degree unnatural to the patient, is of the greatest importance to the doctor.

CHAPTER XII.

The Temperature and the Pulse.

The temperature is taken by means of a small glass thermometer known as the "clinical thermometer." It registers from 95° to 110° Fahrenheit. The degrees are shown by long lines on the scale and every degree is divided by shorter lines into five parts so that from one short line to the next is 0·2 or one-fifth part of a degree. When the bulb is warmed, the mercury rises in the tube, but unlike an ordinary thermometer does not sink again when the warmth is removed from the bulb, unless the thermometer is shaken or "set."

Fig. No. 8. the Clinical Thermometer.

Before taking a patient's temperature, care must be taken that the upper edge of the mercury in the tube which is technically called the "index" is set below 97° F.

The temperature can be taken in the mouth, armpit, or groin. It should be taken in the morning and evening before the patient is washed. The temperature in the mouth is always slightly higher than in the armpit or groin and it is essential to always take it in the same place, and at the same hour. When taken in the armpit, the part should be wiped dry before inserting the bulb of the thermometer, and the arm folded across the chest. The thermometer should invariably be left in the armpit or groin for five minutes as the so-called *Half Minute* and *Minute* thermometers always require much longer to register in these situations.

When the temperature is taken in the mouth, the patient should not have had anything cold or hot to drink for a quarter of an hour previously.

The bulb of the thermometer is inserted under the tongue and the patient is instructed to close his lips, but not to clench his teeth. Patients in a weak condition are unable to keep the lips closed, air will be admitted and the reading made inaccurate. This method is not safe for chidren, or delicious patients, because they may bite off bulb and swallow it.

The thermometer should always be washed in carbolic lotion before it is used for another patient.

The *normal* temperature of the body is 98·4° F. In disease the temperature may be either above or below the normal, the former being much the more common. Patients with a temperature above normal are said to be suffering from *pyrexia* which is simply a Greek word for fever, 101° is considered moderate pyrexia, and 104° F. or 105° F., severe pyrexia. If the temperature reaches 106° F., it is called hyperpyrexia or high fever.

We must here again impress upon the nurse that fever is not a single condition but varies in character. It may be continuous, remittent, or intermittent. A continuous fever is one in which the fever keeps constantly at a high level. A remittent fever is one in which there is a marked difference between the morning and evening temperature, but in which the temperature does not at any time fall to normal. An intermittent fever is one in which for some part of the twenty-four hours there is complete absence of fever.

As indicated in the last Chapter, *Chills or Rigors* are common at the onset of fever. They are accompanied by a rise of internal temperature and marked, often distressing, coldness of the surface and extremities: by sensations resembling streams of cold water running down

the back, by shivering, chattering of the teeth, pallor of the countenance, blueness of the lips and finger-tips, and feelings of distress.

In the absence of the doctor the nurse should apply hot bottles, hot blankets, and give hot drinks during a rigor.

The temperature is recorded on what is called a temperature chart. Some charts are designed to show only the morning and evening temperature, others are printed to record the temperature at more frequent intervals.

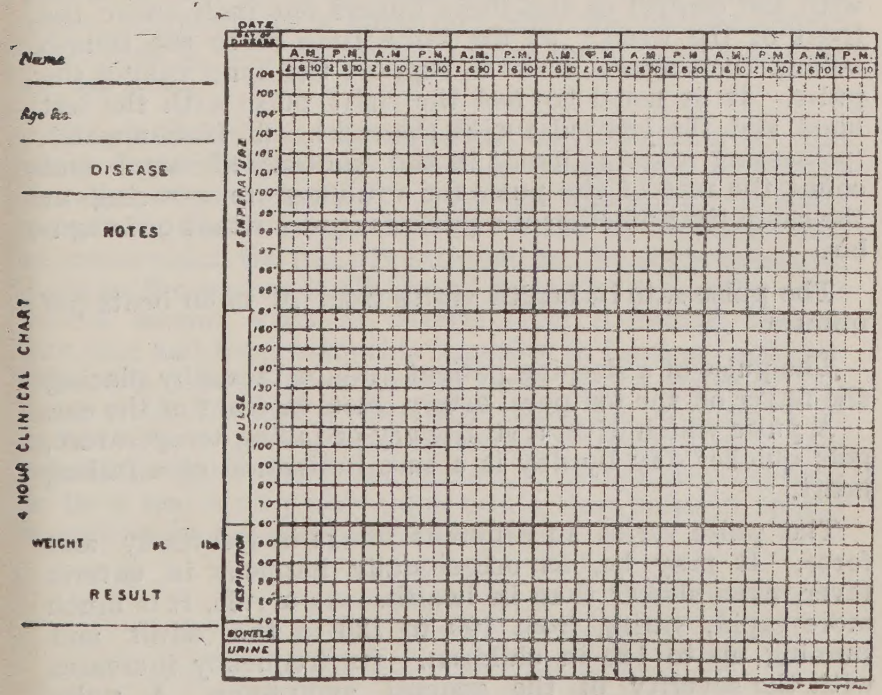

Fig. No. 9. A Four-hourly Clinical Chart

The Pulse.

Taking the pulse needs long and painstaking practice. It is one of the most important guides with regard to the patient's condition. By it one is able to tell whether the patient is gaining or losing strength.

To take the Pulse.—(1) Stand or sit, according to the position of the patient, on the outer side of the right or left upper limb. (2) Place three fingers (the fore, the middle and the ring) on the radial artery, about half an inch from the outer or thumb side of the forearm, and with the central of the three fingers one inch above the front of the wrist; at the same time place the thumb behind the forearm so as to support the hand taking the pulse. It is usual to feel the right pulse with the left hand and the left pulse with the right. (3) Hold a watch (possessing a secondhand) in the unoccupied hand and count the rate of the pulse for a full minute, noticing at the same time whether the pulse is intermittent or irregular.

The pulse rate in health varies from 70 to 80 beats per minute.

The pulse of a sleeping patient may be taken by placing the finger on the temporal artery just in front of the ear.

A pulse which with, a stationary or falling temperature, gets quicker day by day is a sure indication of a failing heart.

The pulse varies in different fevers in frequency and force. It may be, as occasionally happens in enteric fever, even slower than in health. As a rule, it is much more rapid, varing from 100 to 120 in the adult and running up to 180 in children. Its frequency increases with the severity of the general symptoms. A pulse exceeding 120 in the adult is an indication that the case

is severe. Although a rapid pulse is to some extent a sign of severity, slowness of the pulse does not necessarily indicate a mild attack.

A gradual fall in frequency is to be looked upon as a favourable sign. The pulse sometimes, like the temperature, falls below the normal standard in the early days of convalescence. A decided increase in frequency after a fall denotes the advent of some complication. The frequency of the pulse is much accelerated by movement, and this increase is specially noticeable when the patient stands or sits up after lying down. Before taking the pulse, therefore, it is important that the patient should have been in the recumbent posture for at least a quarter of an hour.

The pulse in some fevers is full and bounding in the early days of the attack: and in others soft and what is called "compressible" from the beginning. A compressible pulse is a sign of feeble action of the heart and is one in which the pulse is extinguished by slight pressure. Late in the course of all fevers, the pulse is usually soft. In the second week of enteric fever a double beat is common and frequently it is irregular in force or actually intermits. Both, a very rapid pulse, *i.e.*, a pulse of 120 beats a minute and a very slow pulse, *i.e.*, a pulse of 50 or fewer beats per minute, occasionally occur after severe febrile illnesses in nervous persons. Napoleon is reputed to have had a very slow pulse and a slow pulse in health is said to be an indcation of longevity.

CHAPTER XIII.

Baths and Bathing.

Temperature of Baths.—In addition to the ordinary cleansing bath, baths are ordered for a variety of purposes. The temperature of the different varieties is as follows :—

Hot bath	..	100	to 106	Fahr.
Warm bath ..	..	95	,, 100	,,
Tepid bath ..	..	85	,, 95	,,
Temperate bath	..	75	,, 85	,,
Cool bath ..	..	65	,, 75	,,
Cold bath ..	..	34	,, 65	,,

Before giving any kind of bath, instructions should be obtained from the doctor as to the temperature of the bath, and the length of time the patient is to be kept in it. A bath thermometer should be used at all times to record the temperature.

Cold Bath.—A cold bath is given at about a temperature of 65° F. It is given in cases of hyperpyrexia. In many cases it is not considered advisable to lower the patient directly into the cold water, the temperature, to begin with, being as high as 85° F., and being cooled down by the addition of iced water.

Hot Bath.— A hot bath is given to relieve pain in renal colic, to soothe excitement in cholera and delirium, to relieve retention of urine, and to promote perspiration in the later stages of kidney disease.

These baths are usually given at the bedside, the patient being lifted into them from the bed.

Douche.—A douche is a stream of either hot or cold water directed upon a part of the body from a height : as, for example, when a nurse standing upon a stool, pours a stream of water from a jug upon an ankle that is sprained, a knee-joint that is stiff, etc. The douche may be more systematically applied from a hose, as is done in bathing establishments.

Affusion.—A quantity of hot or cold water thrown over one (as from a bucket) is termed an affusion. Cold affusions are frequently employed in the treatment of sunstroke, heatstroke, and several other affections.

Hot Air Baths.—Hot air may be applied so that the patient does or does not breathe the heated air. In its simplest form, the patient may be seated in a chair surrounded by blankets or other suitable covering from the neck to the floor, and hot air is generated by a spirit lamp or by an electric heating apparatus placed beneath the covering. If a spirit lamp is used, care must be taken to prevent the blanket, etc., taking fire. The patient is kept in the hot air until such time as perspiration flows freely, and the bath is prolonged in accordance with his condition as judged by his pulse, breathing, temperature and general appearance. When removed from the bath, the patient is wiped down rapidly with towels and made to lie down in blankets. Whilst in the hot-air bath he may have hot fluids to drink, the effect of these being to increase the perspiration as well as to relieve thirst. If the face becomes pale or faintness threatens, the bath must at once be stopped.

Vapour Bath.—In its simplest form the vapour bath is arranged in the same way as the hot-air bath, the only difference being that over the spirit lamp a vessel containing a pint or two of water is boiled and steam is thereby generated. The steam may be introduced from the spout of a steam kettle so arranged that steam enters a chamber in which the patient is enclosed which may be either a box specially made for the purpose from which only the head emerges, or formed simply by blankets arranged as for a hot-air bath.

Hot-air and vapour baths are often applied locally to joints or parts of a limb affected by rheumatism, gout, sciatica, or other ailments. Of the many other forms

of bath, there may be mentioned alkaline, acid, mustard, bran, pine, mud, peat, sand, and electric baths. These should never be taken except under the directions of a doctor as to the kind of bath, its duration and character.

Arm and Leg Baths—These are much used for poisoned wounds. They are given in special trough-shaped vessels. The bath is half-filled with water, to which the prescribed lotion is added. The temperature should be 100° F.

Sponging and the hot and cold pack are often ordered by doctors in the treatment of continued fevers.

Sponging.—Sponging is employed to reduce the temperature during fever by the evaporation of water applied to the surface of the body. Cold or tepid water is generally used. A blanket should be spread under the patient and the night shirt removed, bath towels being tucked on each side to catch any water that may run down. The bedclothes, with the exception of one blanket, are removed. After sponging, the patient should only be lightly dabbed with a towel. The water should be maintained at the temperature ordered by the doctor by adding either hot water or ice, according to the time of the year.

The Hot Pack.—Prepare the bed by rolling under the patient a long mackintosh, with a blanket over it. Cover the patient with a blanket and remove his shirt. Take a large sheet, fold it across into four. Wring it out of water as hot as possible, using a sheet or large bath-towel as a wringer. Lay the patient on his back in the bed, lay the hot sheet over him, moulding it well into him, especially into the neck and down the sides. Turn up the sides of the blanket he is lying on. Cover with a mackintosh and plenty of blankets.

Hot drinks promote perspiration. The patient should remain in the pack for twenty minutes. The nurse should

then take away the wet sheet, blanket, mackintosh, and cover up the patient with a hot blanket and leave him for an hour.

The Cold Pack.—Prepare the bed as for a hot pack, wrap the patient in a sheet wrung out of cold water. If the feet become very cold, a hot bottle may be put to them. The sheet must be kept cold by rubbing it down with ice, or by constantly sprinkling it with iced water.

The temperature of the patient must be taken every five minutes, and the pulse watched. The duration of the pack depends upon its effect on the temperature.

Alkaline Baths.—These are prepared by adding six ounces of carbonate of soda, or potash, to a hot bath consisting of about five gallons of water and are given for rheumatism, and to allay irritation of the skin.

CHAPTER XIV.

Nursing of Sick Children.

The observation and sympathy necessary to nurse adults successfully are a thousand times more necessary in the treatment of children. It has been said that to undertake the nursing of sick children is like exploring a strange country where the language is unknown. Children have not the resisting power of adults, and the keenest observation on the nurse's part must be put forth, so that valuable time may not be lost in noting their symptoms. The following must all be carefully noted and reported to the physician: (1) cry, (2) position, (3) movements, (4) temperature, (5) pulse, (6) breathing, (7) restlessness, or (8) langour.

There are certain landmarks in a baby's life which anyone having to nurse young children must know and never forget. These are:—

(1) The normal weights of infants.

(2) The periods of development.

(3) The characteristics of an infant's motions.

1. *The normal weights of Infants.*—The following table

shows the average weekly and monthly increase from a weight at birth of seven pounds.

Period.	Weekly Increase.	Monthly Increase.	Weight.
End of 1st Month.	After 1st week over 5 ounces.	1 pound.	8 pounds.
,, ,, 2nd ,,	4 to 7 ,,	1¾ pounds.	9¾ ,,
,, ,, 3rd ,,	5 ,,	1¼ ,,	11 ,,
,, ,, 4th ,,	6 ,,	1½ ,,	12½ ,,
,, ,, 5th ,,	6 ,,	1½ ,,	14 ,,
,, ,, 6th ,,	4 ,,	1 pound.	15 ,,
,, ,, 7th ,,	3 to 4 ,,	Averages 1 pound but may be a little more or a little less.	16 ,,
,, ,, 8th ,,			17 ,,
,, ,, 9th ,,			18 ,,
,, ,, 10th ,,			19 ,,
,, ,, 11th ,,	5 ,,	1¼ pounds.	20¼ ,,
,, ,, 12th ,,	3 ,,	¾ pound.	21 ,,

From the end of the first year till the child is ten years old there should be a steady yearly increase of three and a half pounds. From the tenth to the sixteenth year a robust child should gain seven pounds yearly.

2. *The normal periods of development*—By the fourth month the baby "takes (intelligent) notice" of his surroundings and has sufficient strength to "sit up" if his head is supported.

At the age of ten months it should begin to creep, and at the age of twelve to sixteen months a baby begins to find his legs and walk alone.

3. *The characteristics of an Infants' motions.*—The motions of infants are characteristic. The first day or two they are of a greenish-black colour. Gradually this

alters to the colour and consistency of beaten-up egg with a slightly sour smell. Three or four motions are passed daily. From eight to twelve months the colour is darker and the motion is more solid and two are usually passed daily.

In conditions of ill-health, the motions may become (1) green, (2) watery, (3) bad smelling, (4) undigested, and (5) they may contain cheesy masses of undigested milk or traces of blood.

A sick infant should be washed with every precaution to avoid a chill. It should be undressed on a small blanket on the nurse's lap and should be lifted on to the knee and enveloped in a soft Turkish towel and carefully dried. The drying process consists in patting the body rather than rubbing it, and it should be done thoroughly. Don't half-dry the baby and then soak up the remaining moisture with powder; this is a lazy way and certain to be productive of rashes and excoriations.

When an infant is cold, additional warmth must be obtained from hot bottles, as additional blankets do not make a chilly little baby any warmer.

A sick baby must be fed regularly, day and night. To an infant there is no night and day, simply twenty-four hours to sleep and feed. A baby should be wakened when its meal-time comes round. Mothers do not like doing this, but the child will soon sleep again and sleep better. Neglect of this rule is frequently a cause of crying babies.

A boat-shaped glass bottle with a teat which will let the milk pass through at the rate of one drop per second is the best variety. Bottles and teats should be boiled once a day, and kept in a basin of clean water, which should be changed after each meal. The food should

accurately measured, strained, and given at blood heat. Hold the bottle for the baby, and withdraw it occasionally to give it a rest.

Always change the napkin before feeding.

The conduct of children when ill depends mainly upon the way they are treated when well. Mothers who desire to have any comfort at all, when their little folk are ill, should remember this ; if they have spoiled their children, if they have made domestic remedies unnecessarily nasty, if they have spoken of the doctor and his medicines as bugbears their *Nemesis* will come when the children fall sick.

Symptoms must never be neglected in children. The bodies of children are frail, and so disease has a dangerous power over them ; there also seems to be a closer union between the parts, and so diseases spread rapidly from one organ to another. An apparently trivial symptom may be the precursor of a serious disease, just as an apparently trivial accident may, if neglected, lead to a life-long deformity.

A flow of tears need not cause the nurse as much anxiety as tearless crying, as the former is usually due to some mental cause, whereas the latter arises more usually from bodily pain. The cry of hunger may be recognised by the hand being carried to the mouth, and by the mouth being moved as though drawing in and swallowing food.

Rolling of the head on the pillow, especially if the eyes be fixed, and passing the hand over the top of the head, are symptoms that should not be neglected, as if not arising from costiveness, medical advice should be at once obtained.

The movements of the mouth, poetically considered the effect of an "angel's whisper," are generally caused by

flatulence; change of posture may relieve this, an rubbing the abdomen with a warmed hand, or laying a ho flannel on it, are also of use.

Feeling a child's pulse often causes a struggle. I however, one finger be given to the child to hold on by and another laid on the wrist, it can generally be counted The pulse may also be felt behind the inner ankle or i front of the ear.

To count the respirations the hand should be laid o the abdomen.

A child should never be put to sleep with an adul Not only is there a risk of "accidentally over-laying, or more properly "careless suffocation," but pure a is even a greater necessity for children than for the grow up, and air contaminated by the emanations from another lungs and skin is injurious. A child in its own cradle c cot can be kept sufficiently warm by an extra blanke or eider-down quilt. Children should never be allowed t sleep with their heads under the clothes as when they d so they re-breathe air which has been polluted by the own lungs.

CHAPTER XV.

The Doctor's Visit.

Everything should be in good order for the doctor's visit, but the patient must not be tired by too much washing and changing of linen beforehand. Hot and cold water, soap, a nail-brush, and a clean towel should always be at hand. In surgical cases, all dressings and safety pins should be got ready and covered with a clean towel. The nurse's notes and charts should be placed in a good light for the medical man's inspection.

In all cases of fever a temperature chart should be prepared at once. The nurse should never wait to get an order to prepare one. She must bear in mind that the notes and this chart are for the doctor to read, and not the sick person, who should not see them. The nurse should never ask the doctor any question whilst in the room with the patient, nor whilst he is making his examination, nor when he is writing a prescription. The nurse should not stay in the room during the whole of the visit as patients often like to be alone with the doctor. When the doctor leaves, the nurse must follow him into an adjoining room, or on to the verandah, so as to take his orders for the day. If she does not understand them she must at once say so, and also inform the doctor if she thinks she is likely to experience any difficulty in carrying them out.

In cases of all severe injuries the following should be got ready for the surgeon's visit:—

(1) Plenty of hot and cold water;
(2) Clean towels and soap;
(3) A nail brush;
(4) A supply of antiseptic dressings;

(5) Tincture of Iodine ;
(6) Nail scissors ; and
(7) A slop bucket.

The following articles should be obtained, if possible for the treatment of special injuries and emergencies :—

(*a*) *For Burns and Scalds :—*

(1) Plenty of lint ;
(2) Absorbent cotton wool ;
(3) Olive oil ;
(4) Bandages ;
(5) Boric powder ;
(6) Vaseline and oil of Eucalyptus ointment.

(*b*) *For Haemorrhage :—*

Ice and sponges.

(*c*) *For Drowning :—*

(1) Several blankets warmed before the fire ;
(2) Hot water bottles ;
(3) Remove sheets from bed ;
(4) Hot tea or coffee ;
(5) Sal Volatile and Brandy.

(*d*) *For open Wounds of any kind :—*

(1) Boric lint;
(2) Boric lotion ;
(3) Soloids of Perchloride of Mercury ;
(4) Gutta-percha tissue or oiled silk ;
(5) Tincture of Iodine ;
(6) Absorbent cotton wool ;
(7) Several bandages ;
(8) A pair of scissors ;
(9) Safety pins.

CHAPTER XVI.

Application of Local Remedies.

The chief local remedies are :—

1. Heat in various forms.
2. Cold.
3. Counter-Irritants.
4. Applications for the skin.
5. Throat and mouth remedies.
6. Eye remedies.
7. Enemas.

1. *Heat—Poultices and Fomentations.—Heat* applied locally has the power of easing pain by lessening the tension in the tissues which is the chief cause of pain in inflammatory conditions. It may be applied as (*a*) *Moist heat* and (*b*) *Dry heat.*

(*a*) *Moist Heat*—Poultices and fomentations are a ready form of applying moist heat.

Poultices are of various kinds, the most common being linseed and mustard.

Linseed Poultice :—Crushed linseed is better for poultices than linseed "meal" which consists of the seed more finely ground.

To make a poultice the following are required ; (1) a kettle and a jug of boiling water, (2) a bowl, (3) a large flat knife, and (4) tow or linen on which to spread the poultice. If tow is used it must first be teased out carefully to the required size.

After the knife and bowl have been heated, a sufficient quantity of boiling water from the kettle is poured into the

bowl. The linseed is then added, being quickly sprinkled with the one hand, while the mixture is stirred with the knife. When sufficient linseed has been added, the mixture will come away clean from the edge of the bowl and should be turned out on the linen or tow, and spread evenly and quickly with the knife, the latter being dipped into the jug of boiling water between each stroke. The layer of linseed meal should be a quarter of an inch thick, and it should be spread to within one inch of the edge of the linen or tow. Before application the edge should be folded in all round. Care should be taken not to apply the poultice too hot; this can be prevented by first testing it on the back of the hand. When placed in position the poultice should be covered with a thick layer of cotton wool and secured by a bandage.

Mustard Poultice.—This consists of mustard mixed with linseed. The mustard is mixed separately with luke warm water and added to a linseed poultice prepared as in the preceding paragraph. The proportion of mustard to linseed varies, but is usually one of mustard to two of linseed.

Fomentations or Stupes.—The best material for a stupe is thick, soft flannel. Lint and absorbent wool are sometimes used and also spongiopiline, which is a kind of felt waterproofed on one side. This last material is excellent but expensive. Boracic wool is used for all formentations in surgical cases. If used for the relief of pain, a fomentation should be changed every half hour at least.

The material for the fomentation should be placed inside a towel or wringer and laid across a bowl which has been heated, the ends of the towel or wringer being wrapped in two pieces of stick and projecting over the side. Boiling water is then poured over the fomentation flannel after which it is wrung dry in the towel, taken out, and

applied as hot as the patient can bear it. Care must be taken to shake it well, so that the steam escapes or the patient will be scalded. It is then covered with jaconet or oiled silk and cotton wool, and bandaged firmly in position.

Turpentine Stupe.—The procedure for preparing a turpentine stupe is similar to the foregoing, with the addition that one or two drachms of turpentine are sprinkled carefully on the flannel before it is wrung out of the boiling water.

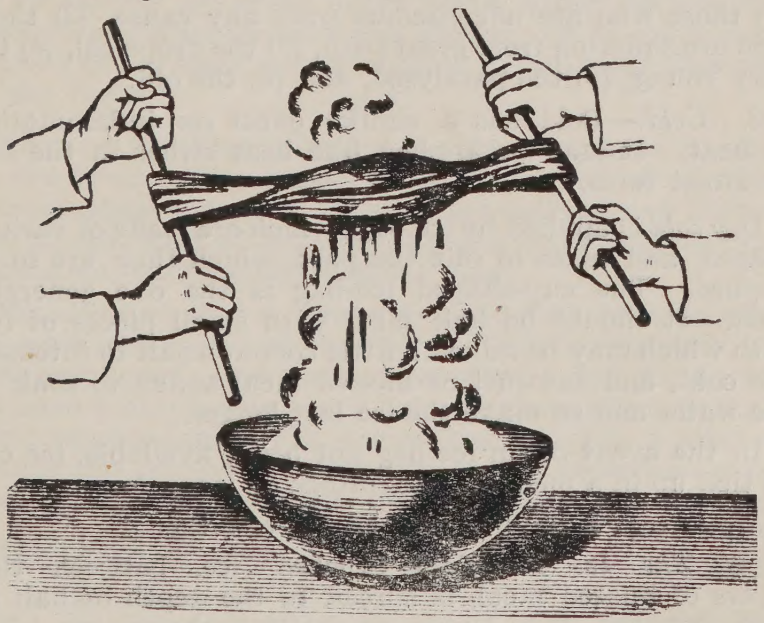

Fig. No. 10. Wringing out a Fomentation.

Laudanum is sometimes applied on stupes, half-teaspoonful of the tincture being sprinkled on the flannel *after* it has been wrung out.

(*b*) *Dry Heat.*—Dry heat is applied by means of hot bottles, which may be of tin, earthenware, or India-rubber. For the feet, either tin or earthenware are suitable. For any other part of the body an India-rubber bag is more comfortable and efficacious. All hot bottles should be protected with thick flannel covers. Care must be taken that the bottles do not leak, and that there are no holes in the covers. Special care must be exercised with the following class of patients, as they are peculiarly liable to be burnt by the application of very hot water bottles: (1) those who are unconscious from any cause, (2) those who are suffering from great pain, (3) the dropsical, (4) the very young, (5) the paralysed, and (6) the old.

2. *Cold.*—Cold has a similar effect on inflammation to heat. It may be applied like heat either in the dry or moist form.

Dry cold is applied by ice bags which are made of various shapes and sizes to suit the part which they are to be applied. The cup-shaped ice-bag is the one generally used. It should be half filled with small pieces of ice, with which may be mixed a little common salt to intensify the cold, and sawdust or linseed meal added to soak up the water and so make the ice last longer.

In the event of an ice-bag not being available, ice can be tied up in a piece of mackintosh or jaconet.

Moist cold is applied in the form of either:—

(*a*) *The Ice Poultice.*—Crushed ice, between thin layers of linseed meal, is spread to the depth of half an inch between two layers of guttapercha tissue. The tissue is then sealed up all round with chloroform or turpentine.

(*b*) *Evaporating Lotions.*—These must be applied on a single thickness of lint, which should be left uncovered o encourage evaporation.

3. *Counter-Irritants.*—A large group of local remedies come under this heading. Counter-irritants are local applications used for the relief of pain or the checking of inflammation, some producing only reddening of the skin, and others actual inflammation.

The effects of counter-irritants may be shortly explained. They affect the nerve endings, and through them cause an impression to be brought by the nerve fibres to some portion of the brain. This causes another impression to be carried by other nerve fibres, either to the spot where the counter-irritant was applied, or to some other portion of the body which received nerves from that part of the brain.

Thus we find that irritating the skin may have an effect on the brain. This is seen in some cases of coma, where consciousness is aroused by what are called flying blisters, *i.e.*, blisters applied to different parts of the body in rapid succession, and each for a short time.

We also find that a counter-irritant may have an effect on some other part of the body. Thus a blister in one situation may ease pain in another ; and fortunately we have a simple rule which helps to show where to make these applications. The nerve that supplies a joint or muscle also supplies the skin over it, so a superficial application generally affects the tissues beneath.

The chief counter-irritants are :—

(*a*) Blisters.
(*b*) Mustard Plasters.
(*c*) Mustard Leaves.
(*d*) Iodine.
(*e*) Liniments.
(*f*) The Actual Cautery.
(*g*) Leeches.

(*a*) *Blisters.*—This form of counter-irritation may be applied in the form of a plaster, or blistering fluid may be painted on the part. When the plaster is used, the part should be well washed with soap and water and sponged with ether to remove the natural grease from the skin. The plaster is cut to the shape and size required, moistened with warm water, placed in position and secured so loosely with a bandage that it will exert no pressure on the blister when it rises.

When blistering-fluid is used, the part to be painted, having been previously washed, should be outlined with vaseline so as to keep the fluid within the required space. Two or three coats are then painted on and the part covered with wool and a loose bandage.

Blisters must be used with great caution, if at all, in children.

The plaster should be left on from ten to twelve hours. If the blister has not risen then, a fomentation should be applied. The plaster is then carefully removed and the blister which has been produced is snipped at its most dependent point with a pair of sharp, sterilised scissors, and the fluid gently pressed into absorbent wool.

(*b*) *Mustard Plaster.*—Two parts of mustard to one of flour are made into a paste with tepid water. The paste is spread evenly on a piece of linen cut to a suitable shape and size, and covered with a single layer of washed muslin before application. It is applied for about fifteen minutes and then replaced by a piece of lint covered with vaseline or simple ointment.

(*c*) *Mustard Leaves.*—These are more convenient to apply than mustard plasters. They are moistened in warm water and applied for the same period as mustard plasters.

(*d*) *Iodine.*—Iodine is so often used as a counter-irritant and antiseptic application for all sorts of wounds that it has been called "the Surgeon's wooden sword."

Iodine should be applied to the skin in the dry state (washing impairs the action of Iodine) it can be painted on with a piece of absorbent cotton-wool wrapped round the end of a piece of thin stick. After the first coat has dried, a second should be applied.

When liniment of iodine is ordered, the directions as to its applications must be minutely observed, as it is very much stronger than the tincture and causes considerable irritation to sensitive skins. The addition of one part of castor oil to eight of tincture of iodine prevents the iodine from cracking the skin.

(*e*) *Liniments.*—Turpentine and a large number of other drugs rubbed in by the hand are very valuable counter-irritants and the immense sale of a patent emulsion of turpentine as a sovereign remedy for nearly every injury is sufficient testimony to its value and widespreadutility.

(*f*) *The Actual Cautery.*—This is a form of counter-irritant more popular with the veterinary than the medical profession. It may be used in two ways :—(*a*) For the relief of pain, in which case the heated point is not brought into contact with the skin, but is moved to and fro just above it, so as to produce a reddening of the surface. (*b*) For the treatment of chronic joint inflammation. Here the point of the instrument which is kept at a dull-red heat is lightly drawn across the part to be treated, so as to produce a superficial burn, which is dresed in the ordinary way.

(*g*) *Leeches.*—These are used for the relief of pain and for checking inflammation. Each leech draws from one to three drachms of blood. The smaller pointed end is the head of the animal.

Before applying a leech, the skin should be well washed and thoroughly dried, and when possible briskly rubbed to bring the blood to the surface. It is important to handle the leech as little as possible. A leech will continue to suck for about three-quarters of an hour. It should never be forcibly removed or its teeth may be left in the skin, which would produce a troublesome wound. A pinch of salt sprinkled on the head will make the leech relax its hold. If the bleeding is to be encouraged a fomentation should be applied to the bites, otherwise a pad of gauze should be strapped over them. The patient should be carefully watched until the bleeding has ceased, as sometimes it persists in a very troublesome way.

4. *Applications for the Skin.*—

Ointments.—The ointments constitute a large group of remedies used for :—

1. Stimulating ulcers.
2. Treating skin diseases.
3. Counter-irritants.

They consist of various powders and extracts mixed with a fatty basis consisting of lard, vaseline, or cold cream.

They should be applied smeared evenly over the smooth side of lint.

The nurse should not use her fingers in rubbing in ointments as they frequently contain powerful drugs such as mercury or belladonna. She should use a piece of lint or clean linen to rub with, and should wash her hands directly afterwards.

5. *Throat and Mouth Remedies.*—

Gargles and Inhalations.—These are used as washes for the mouth and throat. A tablespoonful is to be taken

into the mouth, the head then thrown slightly back and the fluid set in motion by breathing through it, at the same time taking care not to swallow any of it. This should be repeated two or three times on each occasion.

Inhalations.—The word *inhalation* is applied in medicine to the breathing of steam or vapour. The steam may be medicated or plain. Many ingenious inhalers are sold, but although often more convenient, they are hardly more efficacious than the following improvised one :—

Boiling water is poured into a jug, round the edge of which a towel folded into a circular shape is placed. The patient lays his face on the towel and inhales the steam.

A teaspoonful of Friar's Balsam added to a pint of boiling water is one of the simplest *medicated* inhalations and a very valuable remedy in all inflammatory conditions of the throat and bronchial tubes.

6. *Eye Remedies :—*

Eye lotions are used for washing away discharges from the eye. They are applied by means of a vessel called an " eye-bath," already referred to, or by allowing a steady stream from a pledget of cotton-wool, held about two inches above the eye, to run over as much of the inner surfaces of the lid as possible. This is most effectually done by retaining the upper lid in position by means of the thumb, and by placing the forefinger on the lower lid and drawing it downwards, whilst the patient is instructed to look upwards.

Eye drops are applied in different ways according to the purpose for which they are used. When they are intended to act upon the mucous membrane of the eye, the lids must be everted and the remedy dropped

vertically on to their inner surfaces. When drops are used with the object of dilating or contracting the pupil the lower lid is drawn downwards and one or two drops allowed to fall on its inner surface. Before using a drop-bottle, two or three drops should be allowed to escape from the nozzle, so that any foreign matter in it may be washed away.

7. *Enemas.*—Enemas or injections into the bowel are useful, both for constipation and for dysenteric-diarrhœa.

They may be administered either from a fountain-can of water, with rubber tubing attached, placed at some height, or by a Higginson enema syringe.

For self-administration, the fountain-can should be raised about two feet above the patient, who lies flat on the bed with the head low, and a towel under the buttocks. A "rectal nozzle," to be obtained from any chemist, is then attached to the rubber tubing from the can, into which 1½ pints of warm water mixed with soap suds, olive oil, boracic acid or any other special application required has been previously poured.

The nozzle of the douche should be oiled, and then gently and slowly introduced into the bowel passage for about two inches, whilst meanwhile the fingers compress the rubber tube so as to control the flow. About one pint should be allowed to gradually enter the rectum, and should be retained for ten minutes.

If a Higginson's syringe is used, a basin of warm water is brought close up to the patient, who lies on the left side with the knees drawn up. To fill the syringe, keep both ends under water and squeeze the bulb once. The white bone nozzle at one end is then to be fully inserted into the passage, while the other end remains entirely under the water in the basin.

The free hand now gently squeezes the bulb in the middle of the syringe, and forces the fluid into the gut. If given very slowly, no pain or discomfort is caused. About ten or twelve squeezes to the bulb will be sufficient to inject a pint of water.

For the purpose of relieving deep pain and congestion the water should be quite hot; for comstipation and softening hard masses in the bowels, warm water with soapsuds or olive oil is best.

Turpentine enema is given to relieve a painful overdistended abdomen. One ounce of turpentine is well mixed with four ounces of olive oil, and then stirred up in a pint of warm water and soapsuds.

Starch enemas are made by mixing two teaspoonfuls of best starch into a paste with *cold* water and pouring two ounces of *boiling* water upon it. Twenty drops of laudanum may be mixed with the starch in some cases, if ordered by the doctor.

In children, only small amounts of fluid can be injected into the bowel. A child under one year can only retain 1½ to 2 ounces, but after that age, the amount may be increased by one ounce for every year of age.

Nutrient enemas are often ordered in cases of persistent vomiting, or where food is not digested. They consist of egg and milk, soup and arrowroot, or other ingredients and should, if directed by the physician, be predigested by adding peptonizing powders or five grains of pepsin and five to ten drops of hydrochloric acid to the warmed mixture. When pepsins and acid are added, after standing for an hour a little bicarbonate of soda is stirred in until effervescence ceases. Only 3 or 4 ounces should be injected into the bowel about every five or six hours.

Previous to the administration of a nutrient enema, the bowel should be emptied and washed out with a pint of warm water half an hour before the feed is due.

A Nutrient enema is usually given with a soft Catheter attached to a long tube and funnel, The Catheter should be oiled and inserted into the bowel passage as described and pushed up about 6 inches.

The fluid should be poured slowly into the funnel and the tube pinched until all the air is excluded, after which pour in the remainder slowly.

The patient should be instructed to keep very still until the feed is absorbed.

Padding Splints.

This chapter is the most suitable place for a brief reference to this important duty of a nurse, *viz.* :—the preparation of splints for a surgeon.

Splints should never be applied without pads.

Temporary pads are dealt with in my *Indian Manual of First Aid*, but the following method of padding surgical splints, when in a hurry, may be mentioned.

Lay the splint on two thicknesses of cotton-wool and cut round it, leaving an inch free all round. Secure the cotton-wool to the splint by three strips of plaster, one at the top, another at the bottom, and the third in the middle—bringing the ends round the splint and fastening them at the outer surface. This method should only be used whilst pads are being prepared.

For permanent purposes splints should be padded with small cushions filled with cotton-wool or tow.

The pads must always be larger than the splints they have to fit upon, and must project at all sides, so that none of the edges of the splints can touch the skin.

There must be no direct pressure on bony prominences and on joints, such as the knee. The pads must be thicker above and below, so as to prevent pressure on the bone where it is cose beneath the skin.

CHAPTER XVII.

Personal and Family Hygiene.

This is obviously a big subject so the mere fringe of it can only be referred to in this volume.

The reader is referred for further information to the author's Manual, or Primer, of *Tropical Hygiene*.

There are certain points, the care or neglect of which often turn the balance in favour of health or disease :—

These are :—

1. The dwelling.
2. Personal Cleanliness
3. Clothing.
4. Food and drink.
5. Alcohol.
6. Tobacco.
7. Exercise.
8. Rest.

1. *The Dwelling.*—The requirements for a healthy dwelling, whether situated in cold climates or at the Equator, are six in number, namely :—

(*a*) A site which is dry and an aspect which gives light and cheerfulness.

(*b*) A system of sewage-disposal adapted to modern conditions of life.

(*c*) Proper means of ventilation.

(*d*) A proper system of construction which will ensur perfect dryness of the foundations, walls, an roof.

(*e*) Proper means of warming the house in winte and cooling it in summer.

(*f*) Efficient means of lighting.

2. *Personal Cleanliness.*—Regular personal habits a regards strict personal cleanliness are potent agent in the prevention of disease. A daily bath should b taken, and in this tropical climate, where the function of the skin are very active, the frequent use of soap i necessary for the removal of waste products whic accumulate on the surface of the body. A bath take with the chill off (cool, temperate, or tepid bath) ha no pronounced physiological effect. It is, therefor useful only for cleansing purposes and may be taken wit impunity by young and old. The daily bath is a recen institution, even in Britain: as in our grandfather time baths of any kind were very occasionally taker and it is only since their time that the "morning tub has become general. The custom was introduced int Britain by residents from the tropics returing to thei native land. The exigencies of climate demand frequen bathing in warm countries. But the form of bath in vogu amongst natives in the tropics is totally different from tha met with in Britain. The so-called bath of the India consists in pouring cold water over himself, whilst standin in the open air or in a tiled recess in a room. This pro ceeding has a totally different physiological effect fro that of complete immersion for a considerable time i either hot or cold water. The effect of first a hot an then a cold douche is stimulating and hygienic. A saf rule to follow for young and old alike in the tropics is rapid wash down with hot water and then wit

cold water daily, and in addition a warm bath of about five minutes' duration with plenty of soap two or three times a week. In the Tropics it is advisable to avoid a cold immersion bath altogether. The hands and face should be frequently washed, the former especially before meals, as the germs of disease may thereby gain access to the food.

The teeth should receive special attention, as upon their satisfactory condition depends the breaking up of the food. They should be cleaned once, or better, twice a day, in order to prevent food accumulating in the interstices of the teeth, and becoming decomposed there.

Great attention should be paid to the state of the bowels. They should be freely opened at least once a day, and a habit can easily be formed of having them opened every day at the same hour. After the early cup of tea is perhaps the most suitable time. The habitual use of strong purgatives is to be avoided, and habitual constipation can generally be remedied by regular exercise, fruit and oatmeal.

3. *Clothing.*—In the damp parts of India it is better, during exercise, to wear a light woollen garment, as cotton is soon soaked through. Cotton garments are worn in the dry parts of this country as all woollen garments are intolerable in the fierce heat of the Punjab. The thickness and kind of material should be suitable to the special conditions. Fine gauze wool, silk and wool, or merino should be used in the hot weather when they can be tolerated, and Jaeger combination garments in the cold season. Wool is a non-conductor of heat and of the sun's rays. Hence it prevents rapid evaporation and chills, besides being more absorbent of moisture and therefore more comfortable than anything else.

Silk materials come next to wool in these respects; linen and cotton, being very poor absorbents and rapid

conductors of heat, are unsuitable for wear next to the body when, as in exercise, perspiration is profuse. It is useful for women to wear closed knickers of fine cotton over their wool combinations, as these preserve the parts from chills, and the entrance of germ-laden dust.

The official publication, *Hints on the Preservation of Health in India*, says very wisely that the flannel cummerbund, or "cholera belt," generally fails to answer the purpose for which it is intended. It is very difficult to keep in position and either rucks up under the ribs or lies in a roll above the hips. In either case it is of little value as a protection, and after exercise it becomes converted into a wet poultice over the abdomen.

The use of the cholera belt should be restricted to night wear when we consider it most useful. If a blanket is relied on in hot weather, it is frequently tossed off by the restless sleeper with the result that the abdomen is chilled by the draught of the punkah.

In the Tropics this is undoubtedly a source of danger, and it should be carefully explained to those recently arrived in this country that, whereas chill in temperate climates usually leads to nothing more serious than a "cold in the head," in hot countries it is very liable to be followed by a severe attack of either diarrhœa or dysentery.

The corset, as usually worn in the heat of the Tropics, is a most pernicious article of dress. It overheats the region it covers, prevents evaporation from the damp garments beneath, and renders the internal organs liable to chills. It also impedes the circulation of the blood and hampers the action of the lungs, thus preventing the waste materials from being thrown off properly, and so assisting in the production of the dyspepsia, anæmia, and nervous disorders so common in the tropics.

Moreover, tight corsets tend to displace internal organs. When worn in hot weather, they should be of some porous material and *without* steel supports. They may be strengthened instead with whalebone, and have supporters to take the weight of the skirts off the hips and abdomen.

A well-fitted bodice, on which the drawers and skirts can be buttoned is, however, far the more comfortable garment during the heat of the day, and has the ad vantage of being easy to wash. All through the hot weather, undergarments need to be constantly changed and dried, if chills and "prickly heat" are to be avoided.

Where the skin is easily irritated and "prickly heat" induced, a fine silk vest may be worn in place of, or beneath the woollen garment.

In malarious districts open-work or thin socks or stockings should never be worn, as a mosquito can readily bite and infect the wearer with malaria through them. Where thick stockings cannot *or will not* be worn, the individual can protect him, or herself, by wearing two thin pairs one over the other.

4. *Food and Drink.*—Food should be taken regularly and in moderation; it should be chewed well and eaten slowly. We ought to take time in eating our food. By "bolting," or imperfectly chewing, our food before swallowing it, we do not give time for the saliva to mix with it properly: the coarse pieces of food that are thus swallowed resist the action of the digestive juices. Quick eating leads to over-eating and over-loading of the stomach. We do not, then, really know the quantity we have eaten until we feel an uncomfortable fulness about the stomach. This habit finally leads to dilatation of the stomach connected with which is indigestion and a train of other evils.

It is specially important for the European to avoid over-eating on first coming to the Tropics. The whole digestive system is undergoing a change, one special effect of which is that the liver is subjected to strain by the climate in getting rid of the waste products of digestion. The use of excess of animal food is specially to be avoided. The beef and mutton are neither as nutritive nor as digestible as those of temperate climates, and should be taken in moderation. A small reduction in animal food and a larger allowance of vegetables and fruit is all that is usually necessary. Meat meals three times a day are not suitable for a tropical climate and tend to keep the work of the liver in a state of high pressure to get rid of the excessive amount of effete material created. Should anything happen to interfere with this work, the liver breaks down in the process. It is a sound physiological rule to observe simplicity in diet. Highly seasoned dishes, greasy messes (whether made with butter, ghee, fat or oil), pastry, *rechauffes*, and excessive use of condiments, are to be eschewed.

If no stimulants or condiments have been used it is generally right to eat until the appetite has been satisfied. At least two or three pints of water are necessary daily for adults. Some of this is taken in various beverages and so in food. Tea and coffee are useful adjuncts, and unless taken in excess are harmless. Fluid should be taken at the end of meals, and not at the commencement.

Tepid drinks generally slake the thirst most effectually as they soften the mucous membrane or lining of the mouth.

During hard work cold tea or coffee with plenty of milk, or cocoa, form the best drink.

5. *Alcohol.*—Alcohol in some form or other has formed the favourite beverage of civilised men from time

immemorial, and taken in strict moderation it rarely exercises any objectionable influence. What constitutes strict moderation may be stated as follows:—

1 pint of fairly strong dinner ale, or

1½ pints light table or lager beer, or

½ pint light claret, white wine or champagne, or

2 wine glasses of port or sherry, or

3 or 4 tablespoonfuls of brandy, gin or well- matured whisky.

In excess, whether taken in the form of wine, beer, or spirits, it over-exerts the heart, alters the blood-corpuscles, paralyses the nerves, checks the circulation through the capillaries and tends to harden the coats of the arteries. The arteries should be soft and resilient and the excessive use of alcohol tends to alter this normal state of things. A man is as old as his arteries, and the individual who drinks deep will not live long, especially in India.

The use of alcohol in disease is purely a question for medical men, but it should only be taken for as long as it is ordered. Too often stimulants ordered as medicines are continued long after all *other* medicines have been discontinued.

Alcoholic drinks are undoubtedly foods, but the amount of food elements they contain is small and therefore expensively bought. Much of the alcohol itself is not used up in the body at all, but after acting as an irritant and narcotic passes out unchanged, without having been used up by the tissues.

Life in the Tropics has many cares and worries, and it is probable that with some men a small amount of alcohol taken with a meal, after the day's work is over, may

soothe the system, prevent waste of tissue, stimulate flagging energies, and help digestion. In the case of persons who have served many years in India, alcohol *in small quantities* is often a useful addition to the diet.

8. *Tobacco.*—The use of tobacco is one which, to a large extent, must be regulated by the constitution of the individual. In youths it is most certainly harmful, interfering with nutrition and arresting growth. In the adult it is not necessary, but in many people it has a beneficial and sedative effect on the nervous system. Moderate tobacco-smoking by fully developed persons does no harm. It allays the feeling of hunger, and in some unknown way soothes the system and adds to personal comfort. When used in excess it is always injurious, as in undeveloped persons whose hearts are inordinately susceptible to its effects.

The best time for smoking is after meals, it is then better enjoyed and has least injurious effects. It is better not to smoke just before commencing any work requiring much physical exertion.

7. *Exercise.*—Exercise should be regular and systematic. By means of exercise the heart beats more strongly, and an increased supply of blood is thus sent through the body. The breathing is quickened, more oxygen is thus drawn into the lungs, and more carbonic acid expired. The skin acts more freely, perspiration takes place and waste products are thereby got rid of. Owing to the muscles being used, they get firmer and harder, the appetite and digestion are improved and the general tone of the body improved. As soon as food is eaten, the digestive tract is at once supplied with an extra quantity of blood, partly at the expense of the other organs of the body. We should not therefore undertake any hard study, labour or exercise immediately before or

after meals. It is advisable to give the stomach at least a short rest at these periods. But persons in health may do anything that does not require severe exertion. When the active part of digestion is over, we feel once more invigorated and fit for work, whatever it be. Never eat a full meal when in a state of bodily fatigue, as in this condition the digestive process is slow.

8. *Rest.*—As exercise is necessary, so a proper amount of rest is required for the health of the body in order that the fatigued muscles, brain, and other organs may become renewed. This is obtained by sleep, the necessary amount of which depends upon the age and the individual. Young people require much more sleep than old people.

The following table gives the average amount of sleep required by children:—

A child of	4	to	7	years	old	requires	12	hours'	sleep.
,, ,,	7	,,	9	,,	,,	,,	11	,,	,,
,, ,,	9	,,	12	,,	,,	,,	10½	,,	,,
,, ,,	12	,,	14	,,	,,	,,	9 to 10	,,	,,
,, ,,	14	,,	18	,,	,,	,,	9	,,	,,
A young adult	18	to	21	,,	,,	8 to	8½	,,	,,

After 21, each person is a law unto him or herself and some of our hardest brain-workers do well on five or six hours' sleep in the twenty-four hours.

As in the tropical hot weather our nights are often noisy, the bed-room should be quiet, airy and well-ventilated.

The six factors, cleanly dwelling, personal cleanliness, suitable clothing, good food and sufficient exercise and rest are all in favour of health, while the opposites, such as uncleanly surroundings, unsuitable clothing, bad

food, sedentary occupations, and insufficient rest are all against it.

It should be fully understood that no process of hardening against disease germs takes place, so far as is known from continued disregard of precautions. An individual predisposed to a disease, and imbibing the disease germ whatever it may be, will certainly not escape. More especially so if he has been exposed to the enervating influence of great climatic heat or exhausting exertion under a tropical sun.

CHAPTER XVIII.

Convalescence.

A nurse's capabilities have the fullest scope during convalescence. The patient's body and mind are exhausted, and to restore them to strength and vigour constant foresight and care are required. The following points require special attention :—

1. Food.
2. Clothing.
3. Amusement of the patient.
4. Rest.

1. *Food.*—More food is required during convalescence from acute diseases than in a state of health, as the body has not only to be kept at a *particular weight*, but has actually to *increase in weight*. At the same time the digestive system is weak, and so the food must be such as can be easily digested. Soups, milk, puddings, bread and butter, and similar light foods should be given every three or four hours, and indigestible foods should beentirely avoided. It is important not to leave too long an interval between meals, as exhaustion so soon comes on : but at the same time, continued "nibbling" at food must not be allowed. Beef-tea and meat extracts are not sufficiently nutritious to be of much use in convalescence.

Remember that beef-tea is only a *stimulant*, not a *food*. Here is what Dr. Milner Fothergill says of it—

"Beef-tea has an infinitesimal food value, though it is an excellent vehicle for what is really food—*viz.*, biscuit powder, baked flour, or any of the numerous baked

foods now on the market. Myriads of sick persons have been allowed to sink of exhaustion—like a fire burning out—from mistaken notions about beef-tea."

2. *Clothing.*—The convalescent must be warmly and comfortably clad, as a chill may be the cause of delayed convalescence, or even of a relapse. The legs and arms must be especially well protected and a "cholera belt" should be worn until the patient is able to take exercise.

3. *Rest.*—The nurse must bear constantly in mind that a person rests all over when lying down. At least nine to ten hours' rest is necessary at night, and lying down at least an hour after the midday meal is always of service to a convalescent.

4. *The Amusement of the Patient.*—A convalescent must be amused. This is not always easy as a convalescent is often irritable and fractious.

Variety lessens the tedium of convalescence and hastens full recovery. When a patient is recovering from an infectious disease, and has been a long time isolated, the slightest variety, such as a fresh bow of ribbons or some slight change in the nurse's dress, or the altering of the position of the furniture or pictures in the room, is of interest.

Sometimes during convalescence matters come to a standstill, and progress seems to cease. It is then that variety is most important and, if an entire change of scene cannot be managed, changing into another room, even for meal imes, will act as a stimulus to making a fresh start towards health.

Some diseases have special dangers in the convalescent stage. Thus, after enteric, even the slightest error in diet may cause a fatal relapse, and therefore only such

food should be given as has been ordered by the doctor. After scarlet fever there is great risk of kidney-disease supervening, and therefore the patient should be well protected from chills by woollen garments. The urine should be sent for examination every three or four days and the slightest appearance of dropsy, puffiness about the eyes, swelling of the limbs or other symptoms of dropsy must be immediately reported. Paralysis of the muscles of the throat often occurs after diphtheria and the patient should be carefully watched for any difficulty in swallowing. The occurrence of food or drink "going the wrong way" is often an early symptom of this form of paralysis and should be notified at once to the doctor.

The part affected must, to a great extent, guide the treatment during convalescence, for example, if the lungs or throat have been affected, special precautions should be taken against anything likely to cause a chill, or, if the digestive apparatus has been affected, the dieting will require special attention and care.

CHAPTER XIX.

The Nurse's Duties Before and After an Operation.

In India the amateur nurse may frequently be the only assistant available at a big operation. Her duties, prior to an operation, fall under the following headings :—

(1) Preparation of the room.
(2) Preparation of the patient.
(3) Preparation of the nurse.

Having thoroughly cleansed the room as detailed in Chapter I, the following articles should be procured and arranged in convenient positions :—

(*a*) Operating Table.
(*b*) Bedstead.
(*c*) Table for dressings.
(*d*) Washstand.
(*e*) Instrument Table.
(*f*) Swab Table.
(*g*) Sterilizer.
(*h*) Anæsthetist's Table.

(*a*) *Operating Table.*—A table about six feet long, two feet broad, and twenty-eight inches high, will be required for the patient to lie on during the operation. An ordinary kitchen table will usually be all that is necessary.

(*b*) *Bedstead.*—The bedstead should be thoroughly cleansed, the mattress aired, and the bed made up with clean sheets and a clean drawsheet with some mackintosh sheeting underneath it.

Hot water bottles, carefully covered with flannel so that they cannot burn the patient, should be got ready and especial care taken that the metal stopper is not in any way exposed.

(*c*), (*e*), (*f*) *and* (*g*) *Tables for Dressings, Swabs, Instruments and Anæsthetist.*—Four small square tables—teapoys will do—to be used as follows:—One for the basins in which the swabs will be rinsed, one for the instruments, one for the anæthetist's apparatus and one for the dressings. These tables should be thoroughly dusted with a damp cloth, and then covered with clean sheets or towels.

Two chairs, with wooden or cane seats, dusted like the tables, one for the anæsthetist, and one for the operator, if he needs it.

(*d*) *Washstand.*—A washstand for holding a basin for washing the hands and a basin of biniodide of mercury (1 in 1,000) to finish the preparation of the hands.

A nail-brush sterilised by boiling or immersion in a solution of biniodide of mercury (1 in 1,000).

A cake of soap.

Two clean blankets and one sheet for the operating table.

Twelve clean towels, not new.

Two dishes, one for the instruments, measuring if possible, twelve inches square, and a smaller dish, six inches square, for the ligatures and sutures. Meat dishes will do very well. Wash-hand basins will do if others are not obtainable.

Three bowls, one for the lotion for the hands and two for the swabs.

These dishes and bowls should be thoroughly cleaned and scalded before use, and then turned upside down and covered with towels until they are required, in order that dust may be excluded. Just before they are to be

used, the dishes and bowls can be boiled, or, having been scalded and dried, they can be effectually sterilised by burning in them a little methylated spirit.

Three gallons of cold water which have been boiled, and two kerosene oil tins of boiling water must be got ready just before the operation. Provision must be made for a further supply in case it may be required. The water should be poured into water jugs and the mouths of the jugs should have gauze tied over them to keep out dust and insects.

A foot-bath, or pail properly cleansed, for receiving the soiled water, etc.

2. *Preparation of the Patient.*—Before all operations the patient has to be prepared, and such preparation should include rest in bed, a report on the pulse, temperature and respiration, douching, shaving, bathing and surgically cleaning the skin over the operation area. In addition, the bowels, bladder, and patient's dress have to be attended to, and the surgeon will probably require a sample of the urine to be sent for examination.

Solid food should not be taken for three or four hours before an operation.

Rest.—In all cases, if possible, the patient should be kept in bed for the twenty-fourhours before operation. For abdominal operations it is better to increase this period to two or three days at least, so that the nervous system may be quieted and the bowels well emptied. In certain cases a prolonged rest may be advisable.

Pulse.—The rate and character of the pulse should have been noted carefully as long as possible before the operation and its frequency charted regularly twice daily. Such a procedure is most important. Nurses are apt to be careless in charting the pulse before the operation, and it may be that during this time the rate

has been above or below normal. After the operation a similar rate continues, and the operator is puzzled as to its cause when the condition may be the normal for that particular patient.

Respiration.—The respiration rate should be charted.

Temperature—The temperature should be charted twice daily unless the doctor orders this to be done more frequently. The same remarks apply as to the importance of taking the respirations and temperature as to that of taking the pulse.

Mouth.—It is most important that the mouth and teeth should be attended to before an operation. If the teeth are decayed, and if there is time, a dentist should be consulted. Certainly some cases of septic pneumonia after operations can be traced to the filthy condition of the patient's mouth.

The patient must clean his mouth and teeth with some efficient tooth-powder and if he is too weak to do so the nurse must do it for him with some pleasant antiseptic, such as glycothymoline placed on small pledgets of wool and held in forceps.

Urine —It is most important that a proper examination should be made of the urine before a major operation, as it is highly dangerous to operate in some diseases without certain knowledge as to the condition of the kidneys.

Bath.—On the afternoon before the operation the patient should have a hot bath if the surgeon considers it desirable.

Dress.—The patient should be dressed in clean sleeping garments, and plenty of light and warm wraps should be available to cover up exposed parts and thus diminish shock.

Food.—Four hours before the operation the patient should be given a cup of tea and a small piece of toast and butter.

3. *Preparation of the Nurse.*—The nurse should be quite healthy, and not suffering from such conditions as sore throat or septic wounds about the fingers.

The nurse must wear a perfectly clean apron. All rings should be removed from the fingers, even wedding rings.

On entering the operating room the nurse should remove her cuffs, and roll up the sleeves of her dress up to the elbow.

She should wash the hands and forearms up to the elbow with soap, and nail-brush, and, if possible, in running water.

After which she should put on a sterilised overall and see that it covers the clothes at the back as well as the front, again washing her hands and arms as before.

Care of the hands.—The nails should be kept so pared that they can be cleaned effectively with the nail-brush. It is harmful to scrape beneath them just before a dressing or an operation. The skin should be kept smooth. This is best done by always drying the hands carefully after washing, and by the regular use of a little diluted glycerine.

The fingers should not be contaminated with pus, and all dirty dressings should be removed with dressing forceps.

On entering the operation room, and before helping in any way with the instruments, etc., the hands should be thoroughly washed for a period of not less than three minutes by the clock. The hands and forearms should

be scrubbed with a sterilised nail-brush until a good lather is obtained, using plenty of hot water; particular attention being paid to the nails and clefts between the fingers. Dry the hands on a fresh sterilised towel which is not to be used for the purpose again. If the hands are to be washed in an antiseptic, or if rubber gloves are to be used, this drying is unnecessary.

General Rules.—Regard everything not fresh from the steriliser as surgically unclean, and repeat the washing of the hands whenever they have touched any such article.

An overall, when once it has left the tin, must, as regards touching with the hands or sterilised articles, be looked upon as surgically unclean.

If a nurse is asked to swab, she should see that her fingers never touch the wound, and must not shift her hold on the swab so as to bring the part she has touched into contact with the wound.

Duties After the Operation.

Tidying the room after an operation.—After the operation and before the patient recovers consciousness, the soiled linen, operating table, and instruments should be removed and the room re-arranged: two tables being left, one for the dressings and one for the use of the nurse. An armchair and camp-bed or sofa for the nurse to sleep upon, if there is only one nurse and it is necessary for her to remain in the room during the night, should also be provided.

A lamp, properly shaded so that the nurse can read or write her report without disturbing the patient will be required, and the room must be kept as quiet as possible, so that the patient may sleep when he recovers from the anæsthetic. Relatives or friends must not be admitted unless and until the doctor gives permission, and the

nurse must never leave the patient alone, so that if she wants help, she must summon it by a bell which should always be provided.

Cleansing the Instruments.—This duty may have to be left for some little time, as the nurse will probably have to attend to the patient first, meanwhile, if the surgeon wishes his instruments cleaned, the best plan is to put them into a basin and cover them with cold water.

When there is time to clean them, the instrument should be well washed with cold water, soap and soda, to remove the bloodstains, after which, if they are again washed with hot water and scrubbed, all the joints being carefully examined to see that no *debris* is adhering to them.

Lysol forms a very good medium to wash the instruments in: it is an antiseptic of a soapy nature, and helps to polish them.

Attention to the Patient.

On his return to bed the patient should be covered with a hot blanket and the hot-water bottles should be again inspected to see that they are efficiently protected. An unconscious patient cannot feel he is being burnt, and wounds, taking many months to heal, have resulted from carelessness in this respect.

The patient's head must be kept low, and a towel should be adjusted round his neck and a small porringer placed in position so that if he wants to vomit, the night attire and bedclothes will not be soiled.

If the operation is an abdominal one, and there is retching or vomiting, the nurse must support the abdomen with a hand on each side of the incision to prevent undue straining of the sutures. This action will also lessen the pain. When the vomiting has ceased, the nurse should cleanse the mouth with small pledgets of wool

wrung out of a mixture of glycerine and lime juice and held in forceps.

As already mentioned, the nurse must never leave the patient till he recovers from the anæsthetic, as he may be very restless and throw himself out of bed.

The nurse should pay no attention to what the patient may have said under the influence of the anæsthetic, and should, of course, never repeat it either to the patient or anyone else.

Pulse—The pulse should be taken every four hours and charted. The pulse is by far the most important means we have of estimating how the patient is progressing after an operation, and all nurses would be wise to practise taking it on every suitable occasion.

The pulse is quickest for the first twelve hours after an operation, but during this time should not exceed 120. After this, as a rule, if everything is progressing satisfactorily, it falls below 100. If the pulse does not fall, but continues to rise, this is, as a rule, a bad sign. In shock and hæmorrhage the rate may be increased to 140 or more, becoming at times uncountable, whilst in hæmorrage the pulse is very soft and weak. Distension of the intestines by flatus, if marked, will increase the frequency, and in peritonitis the pulse rapidly increases in frequency to above 120, and is hard and wiry.

Temperature.—The temperature should be taken every four hours and charted. As a rule, in about eight hours after a serious operation the temperature rises to nearly 100° F. During the next twelve hours it keeps at this level, and then gradually falls to normal.

A subnormal temperature points to shock or bleeding.

A rapidly rising temperature, especially on the second day, after an abdominal operation, is of very serious import, pointing to peritonitis.

A persistently high temperature without any apparent cause is usually found on examination to be due to sepsis, but in cases where the patient is very neurotic, the temperature may rise for a few hours. In many cases fever will disappear after the bowels have been opened.

Respiration.—The nurse must note the respiratory rate. If rapid soon after an abdominal operation it points to shock or hæmorrhage, and later an increase in its rate usually indicates the onset of bronchitis, pneumonia or peritonitis.

The Tongue.—For the first twenty-four hours after an abdominal operation the tongue is generally dry and rather brown. After this it should be moist and rather white. In peritonitis and intestinal obstruction it becomes dry, brown or red, glazed or ulcerated.

Food.—Three to four hours after an ordinary operation the patient should be given four ounces of tea and milk, or hot milk and water. The subsequent feeding depends on which day the surgeon orders the aperient, as before this liquid diet is prescribed. After the bowels have been well opened the patient is given bread and butter, custard and chicken, and quickly returns to ordinary diet.

Change of Position.—To help the patient to move in bed and alter his position various contrivances are employed. One of the most useful is to suspend by a rope from the ceiling, or by a hook fixed above the head of the bed, a smooth, round stick about 15 inches long and about 1 inch thick, so that it hangs crosswise just within easy reach. In this contrivance the patient finds great confort: by grasping it from time to time in his hand he may rest his arms, or he can alter his position in bed as he pleases. In certain illnesses, especially those affecting the lungs and heart, and during convalescence from any illness, a bed-rest affords a welcome change of position.

CHATER XX.

The Roller Bandage..

Bandages serve many purposes, and are used for (*a*) covering and protecting an inflamed or injured part, (*b*) keeping an injured part at rest, (*c*) retaining a broken bone in good position, (*d*) causing pressure on the sides of a wound and over a bleeding vessel, (*e*) compressing and reducing the size of a swollen limb, and (*f*) retaining in position splints and dressings.

Roller bandages may be bought ready-made of different materials, *viz.* :—linen, calico, web, gauze, etc. They can, however, be easily made by tearing strips, 2½, 3 or 4 inches wide, from a piece of calico or Indian marken

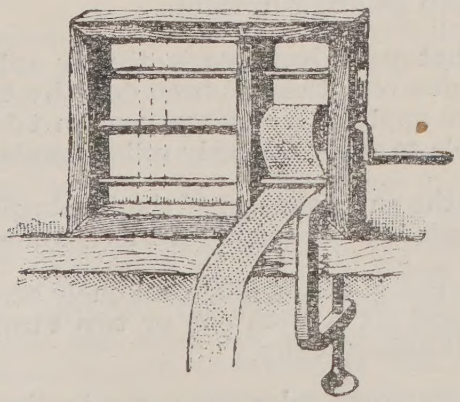

Fig. No. 11. Bandage-winding machine.

6 yards long, taking care to remove the selvedge. These strips must be firmly and uniformly wound up in rolls either by the fingers or by means of a bandage-winding machine. (Fig. 11).

In order to apply the common roller bandage to any part of the body, the first thing to learn is how to judge of the firmness and support required, and to distribute the pressure evenly about the limb. For this purpose the bandage must always be kept rolled up (dropping it is a sure sign of a bungler or a beginner), and held three or four inches away from the part, while the finger and thumb are used to retain the bandage in its place when it is being applied.

The following general rules must be mastered before commencing the practical use of the roller bandage :—

(1) Stand in front of the limb to be bandaged, and place it in the exact position in which it is to be kept : if it is the upper limb, bend the elbow and place the hand with the thumb pointing upwards.

(2) See that your bandage is tightly rolled. If the bandage is a new one, this has been done by the manufacturer, but in re-applying a bandage you must do it yourself. It is impossible to apply a loosely rolled bandage properly.

(3) Place the outer surface of the bandage next to the skin, as it unwinds more readily if this is done.

(4) Pass the end of the bandage obliquely across the limb at the start and fix it with one or two turns round the limb so that it does not slip.

(5) Bandage from below upwards in the lower limb and always have the upper part somewhat looser than the lower. Bandage from the hand to the elbow in the upper limb, and from the foot upwards in the lower limb, but from above downwards in the trunk.

(6) Start bandaging from within outwards over the front of the limb.

(7) Overlap two-thirds of the preceding fold by each fresh turn of the bandage.

(8) In reversing, the turns should be kept parallel and at equal distances apart; and made downwards, towards the extremity of the limb.

(9) Always form a figure of "8" at a joint.

(10) Firm and equable pressure must be maintained along the whole of the bandaged portions of the limb. If a swollen leg or arm be tightly bandaged about its middle and loosely bandaged above or below, the bandage will do harm by obstructing the circulation, and thus causing increased swelling above, or below, the seat of constriction.

(11) If on removing the bandage, red lines are found on the skin, it is an indication of unequal pressure produced by the edges.

(12) After the whole of the bandage has been applied, its end should be fixed by a pin, except in the case of a bandage on the chest or belly, when the end should be stitched with ordinary thread to the portion of the bandage underneath. Additional security is given by stitching the different turns of the chest bandage together, as bandages round the chest are apt to become loose with the constant movements of breathing, and a pin, placed over the back, is likely to cause much discomfort.

(13) Never attempt to apply a bandage without first completely winding it up.

14) In taking off a bandage gather the slack into a loose bundle and pass it round the limb.

The Methods of Applying the Roller Bandage.

There are four methods of applying the roller bandage :—

1. The Simple Spiral.
2. The Reverse Spiral.
3. The Figure of "8."
4. The Spica Kandage.

1. *The Simple Spiral.*—This is made by encirclin the limb with a series of turns of the bandage, each turn covering two-thirds of the preceding one.

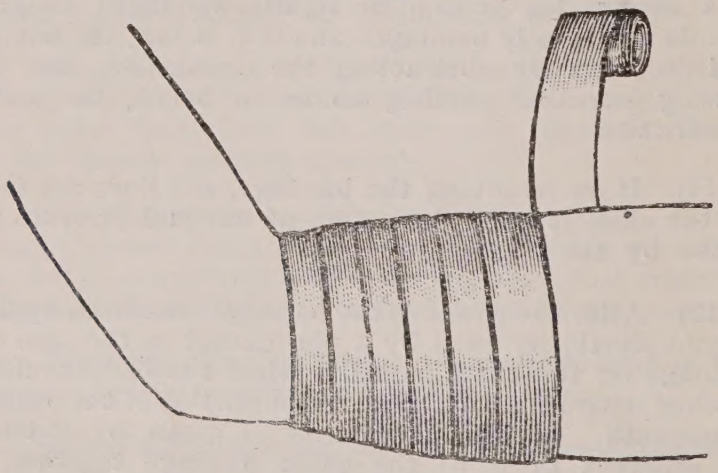

Fig. No. 12. Simple Spiral of the Upper Arm.

This method of application is only of use where the part to be bandaged is of uniform thickness, such as the forearm just above the wrist, and the fingers.

2. *The Reverse Spiral Bandage.*—The object of this method is to make the bandage lie smoothly and firmly over parts of a limb which vary in thickness—such as the calf.

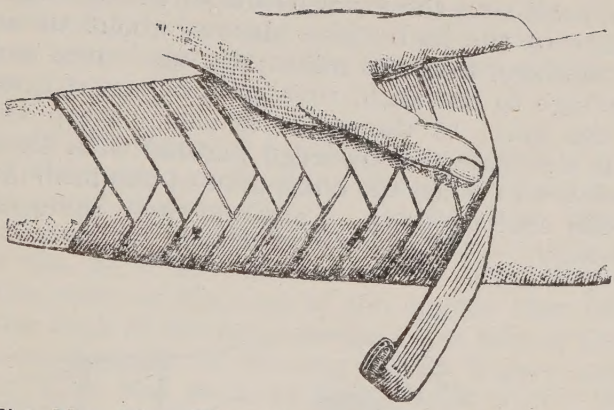

Fig. No. 13. The Reverse Spiral Bandage.

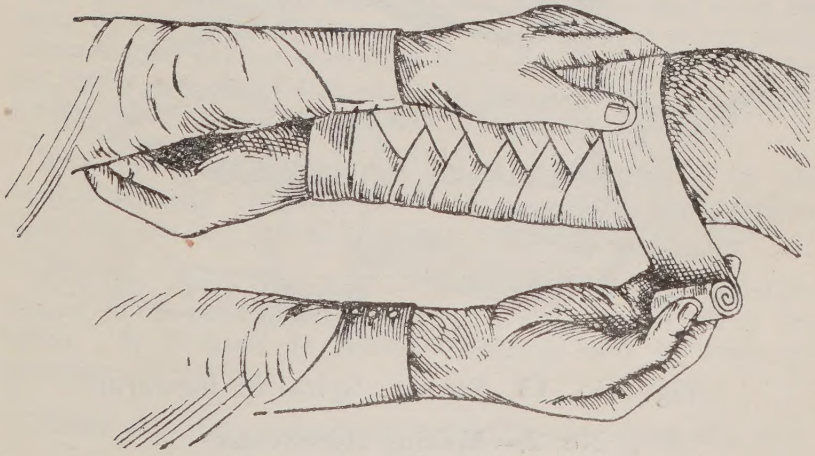

Fig. No. 14. Reverse Spiral of Forearm.

No. 1.—Preparing to reverse.

The procedure is as follows.—First take a couple of spiral turns round the limb, hold the roll of bandage lightly in one hand and place the thumb of the dis-

engaged hand over the lower border of the bandage, on the outer side of the limb; now slacken about three inches of the bandage, turn the roll in the hand over and apply the bandage to the limb, reverse and pass it downwards under the limb, to the opposite side. Keep the lower edge of the reserved bandage parallel with that of the turn below and when the outer side of the limb is reached make the reverse again. Continue these reverses as far as necessary.

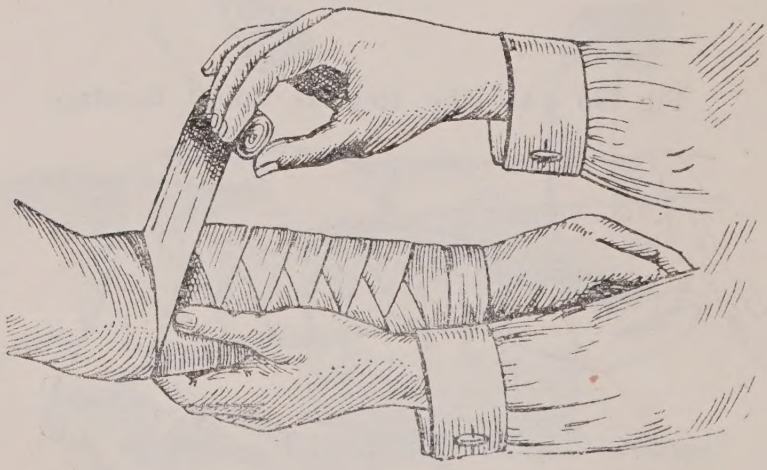

Fig. No. 15. Reverse Spiral of Forearm.

No. 2.—Making the reverse.

This bandage is firmer than the simple spiral, and is to be preferred for fixing splints to a limb. Its disadvantages are that it is somewhat liable to slip, and it is not elastic. It is not suitable for the neighbourhood of joints.

3. *The Figure of 8 Bandage.*—This consists of a series of loops, each loop forming a figure of 8, and overlapping the one below by about two-thirds the width of the bandage.

To apply the figure of 8 bandage to a part, *e.g.*, to the back of the hand, proceed as follows:—Take a couple of turns round the wrist to fix the bandage, then carry the bandage from the thumbside of the wrist across the back of the hand to the base of the little finger, then across the palm at the root of the fingers, then obliquely across the back of the hand to the outer side of the wrist, then across the palm at the root of the fingers, and again obliquely over the back of the hand towards the root of the little finger, leaving about one-third of the first loop uncovered, then again across the palm and over the back of the hand to the wrist. Repeat these turns about three times, taking care that the loops overlap each other by about one-third the width of the bandage, and finally fix the bandage with a circular turn round the wrist.

The figure of 8 bandage is chiefly employed in the neighbourhood of joints; it is less firm but more elastic than the reverse spiral bandage.

4. *The Spica Bandage.*—This is a modification of the figure of 8 bandage, having one loop larger than the other. It is used to retain dressings and to keep up pressure on a joint.

There are two methods of applying the Spica, *viz.*:—

(*i*) *The Ordinary Spica.*—This variety is used at the shoulder and hip.

(*ii*) *The Divergent Spica.*—This method is used to cover in large prominences, such as the heel, the bend of the knee, and the elbow.

BANDAGES FOR VARIOUS PARTS OF THE BODY.

(1) *The Finger Bandage.*—Take a bandage $\frac{2}{3}$ or $\frac{3}{4}$ of an inch wide or a hank of tape wound tightly into a roll.

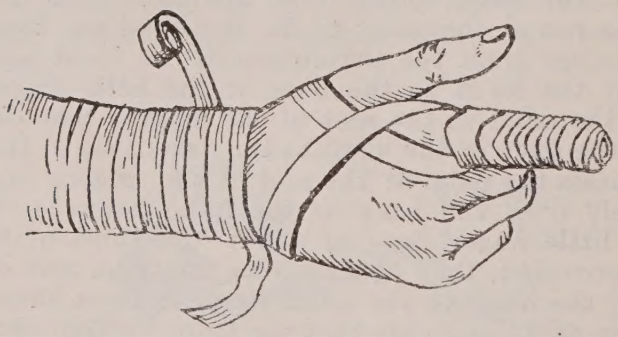

Fig. No. 16. The Finger Bandage.

Place the hand palm downwards. Make a turn at the wrist leaving a free end of three or four inches, carry the bandage up the back of the hand to the finger to be bandaged and by one large spiral to the tip of the finger, which is then covered with a series of spirals from tip to root, each turn overlapping two-thirds of the preceding one. When the root of the finger is reached the bandage is carried across the back of the hand to the inner side of the wrist, and fixed by tying it to the free end left for the purpose.

If more than one finger is to be bandaged, a turn round the wrist should be taken before commencing the next finger.

(2) *The Thumb Bandage.*—Take a finger or tape bandage as above.

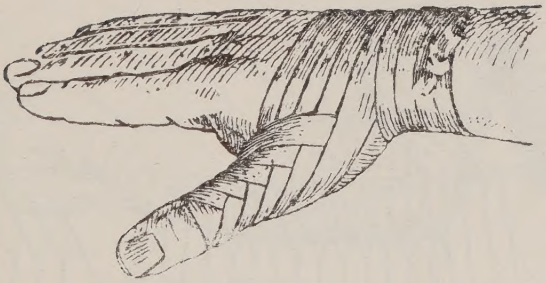

Fig. No. 17. The Spica of the Thumb.

Place the back of the hand uppermost, make two turns round the wrist, commencing at the root of the thumb to fix the bandage, and carry the bandage upwards from the root of the thumb to between the thumb and forefinger, encircling the first joint. Take the bandage across the back of the hand and round the wrist, bringing it back to the root of the thumb. Carry it up again and encircle the thumb, covering two-thirds of the former loop : then take it across the back of the hand and repeat these turns round the wrist, and the loops round the thumb each at a lower level than the preceding one, until the thumb is covered. (Fig. No. 17.)

3. *The Hand and Forearm Bandage.*—Take a 2½ inch roller bandage, make a couple of turns round the wrist, commencing at the root of the thumb and passing outwards over the back of the wrist. Carry the bandage upwards and outwards over the back of the hand to the root of the little finger, take it across the palm, in which has been placed some cotton wool, and bring it up between the thumb and the root of the forefinger.

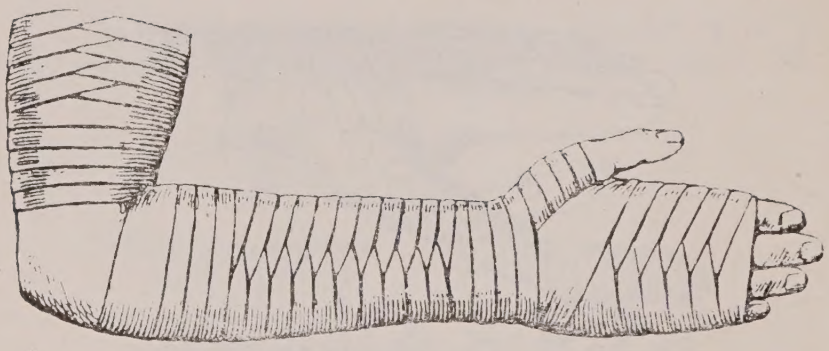

Fig. No. 18. The Upper Limb Bandage.

Carry the bandage over the back of the hand to the inner side of the wrist and encircle the wrist and hand as before, this time, however, covering the former turn and the roots of the fingers.

When the hand is sufficiently covered by these turns, the forearm is bandaged by a few spirals until the increasing thickness of the arm necessitates a series of reverses which should be kept in line on the back of the forearm.

4. *The Elbow Bandage.*—First bend the elbow and then take a bandage $1\frac{1}{2}$ to $2\frac{1}{2}$ inches wide and make a few turns below the joint and then bandage once horizontally round the centre of the joint without reversing, taking care to apply the centre of the bandage over the bony prominence on the outside of the elbow.

Now carry the bandage round the joint from within outwards at a somewhat lower level than the horizontal turn thus making the lower loop of the figure of 8.

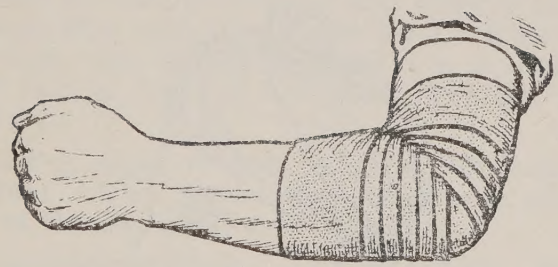

Fig. No. 19. The Elbow Bandage.

Complete the upper half of the loop by carrying the bandage round the joint at a slightly higher level than the horizontal turn, and continue the loops, above and below the horizontal turn until the joint is sufficiently supported.

This bandage is used when it is required to keep the elbow in a bent position.

5. *The Shoulder Bandage.*—The shoulder is one of the most difficult parts of the body to bandage. There are two kinds of bandages for the shoulder, *viz.* :—

(*a*) The Ascending Spica.

(*b*) The Descending Spica.

(*a*) *The Ascending Spica.*—This is applied from below upwards. Take a roller bandage 2½ to 3 inches wide and at least 10 yards long and fix the free end by making two turns from within outwards round the arm about four inches below the shoulder.

Place a small pad of cotton wool in both armpits.

Fig. No. 20. Ascending Spica of the Shoulder.

Carry the roller up the arm to the back of the shoulder across the back, under the opposite armpit and thence obliquely across the chest to the starting point.

Pass the bandage round the arm half an inch above the lower edge of first turn, and repeat the turn across the back and chest.

Continue to bandage the arm and body in this manner, taking care that each turn is at a level half an inch above the previous one, until the shoulder is covered. Fasten the last turn in front of the chest by a few stitches or a safety pin.

The lower edges of the bandage will make a series of inverted " V's " where they cross each other on the outside of the bandaged arm.

(*b*) *Descending Spica.*—This is applied from above downwards as follows :—Bandage by means of reverses to the level of the armpit and then carry the roller over the front of the shoulder and as high up the neck as possible, round the back to the opposite side. Then

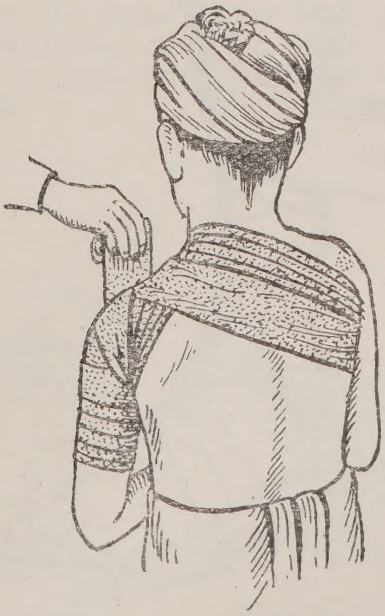

Fig. No. 21. Descending Spica of the Shoulder.

pass it under the arm on that side and across the front of the chest and front of the arm on the side to be bandaged. Now carry it under the armpit and over the shoulder again to the back, but this time on a lower level than the preceding turn, and so on until the level from which we started is reached.

6. *The Arm Bandage.*—The upper arm is bandaged by a series of spirals and reverses as in the forearm, until the shoulder is reached. (Fig. No. 18).

7. *The Ankle Bandage.*—Take a 2½ or 3 inches bandage and apply the free end over the inner ankle bone, carry it across the instep to the root of the little toe, and take

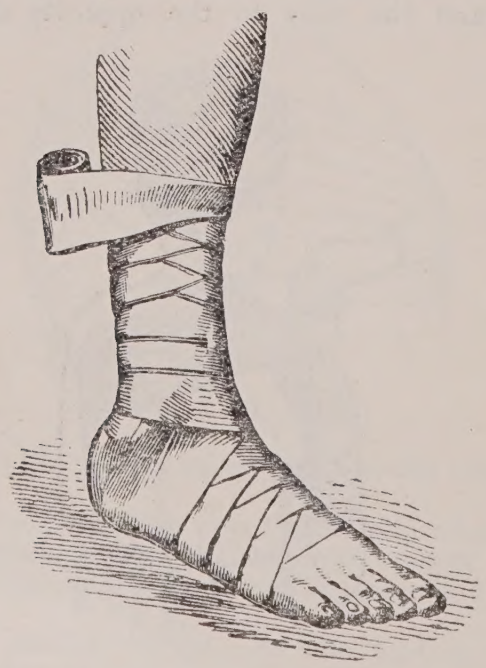

Fig. No. 22. Figure of 8 of Ankle.

it beneath the foot to the ball of the great toe. Bring it up over the instep and the outer ankle bone, round the back of the leg a few inches above the heel, overlapping and fixing the commencement of the bandage.

8. *The Heel Bandage.*—Place one end of the bandage across the outer ankle; carry the roller under the sole to the inner ankle, and thence outwards over the front of the instep to the starting point. Now carry the bandage outwards over the most projecting part of the heel, and inwards and across the front of the instep, and then under the sole of the foot, covering the lower edge of the loop which passes over the heel. From this point carry the bandage over the front of the instep, and then above the point of the heel, back to the instep, and continue so that each loop over the point of the heel is a little further from the preceding one, until the part is covered. Finish with a couple of spiral turns round the lower part of the leg and pin off.

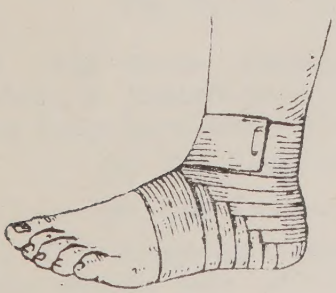

Fig. No. 23.

The Heel Bandage.

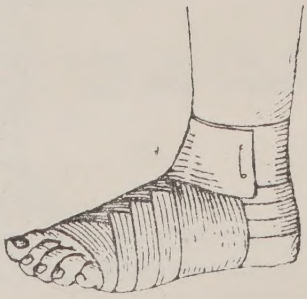

Fig. No. 24.

The Foot Bandage.

9. *The Leg and Thigh Bandage.*—The small of the leg is covered by three simple spirals, and, as the leg increases in thickness, a series of spirals and reverses are made until the knee is reached. The knee is passed by a figure of 8 bandage and then the thigh is covered by a series of spirals and reverses, as in the leg bandage, and fastened at the hip.

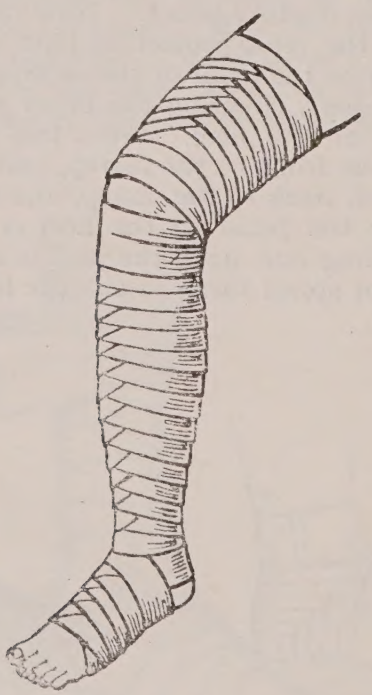

Fig. No. 25. The Lower Limb Bandaged.

10. *The Knee Bandage.*—First slightly flex the knee, then lay the free end of a bandage 2½ to 3 inches wide and about 4 yards long against the inner side of the knee,

and carry the roller over the front of the knee-cap to the outer side of the knee and then back to the starting point ; then across the front of the knee, covering the lower loose margin of the turn above, then back to the starting point, and again across the front of the knee, this time catching the upper loose margin of the first turn ; continue these figures of 8 above and below alternately.

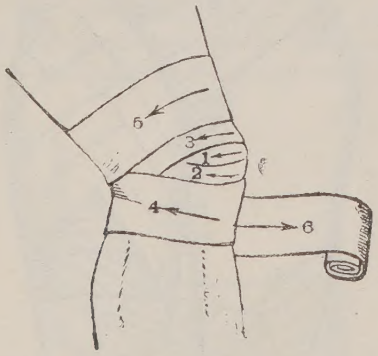

Fig. No. 26. The Knee Bandage.

11. *The Groin Bandages.*—The groin is like the shoulder, a difficult part to bandage, and two varieties of the Spica have been devised for it, *viz.* :—

(*a*) The Ascending Spica.

(*b*) The Descending Spica.

(*a*) *The Ascending Spica.*—First slightly flex the hip on the affected side and then with a bandage 2½ to 3 inches wide and 10 to 12 yards long, take a couple of spiral turns round the upper fourth of the thigh. Make reverses up the thigh till the groin is reached : then carry the bandage across the front of the groin outwards and upwards to a little above the hip joint, then across the

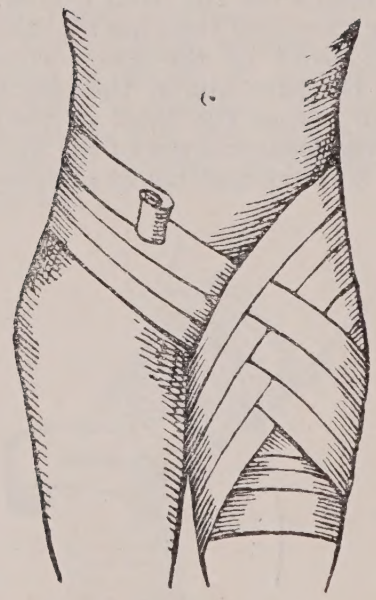

Fig. No. 27. The Ascending Spica of the Groin.

small of the back, and over the hip on the opposite side to the front of the abdomen, and immediately above the private parts back again to the affected groin. Now carry the roller round the thigh to the inside, over the groin, and again across the body. Continue the turns till the part is covered, making each turn go about half an inch higher than the lower edge of the preceding one and fixing with a few stitches or a safety pin.

(*b*) *The Descending Spica.*—Take a bandage 2½ to 3 inches wide and 12 yards long. Bend the hip slightly and lay the free end of the roll along the groin, *i.e.*, at the junction of the thigh with the abdomen. Carry the bandage outwards and upwards to a point well above the opposite hip joint, then across the small of the back

bringing it round in front to the affected groin again, where it should cross the former fold but at a lower level. The bandage is now made to encircle the upper part of the thigh, and is brought out in front between the thighs and carried upwards at least an inch below the lower edge of the first turn round the body.

Repeat these turns, making each turn lower than the preceding one, and over-lapping it by about two-thirds of the width of the bandage until the wound is covered and finally fix the end of the bandage with a safety pin.

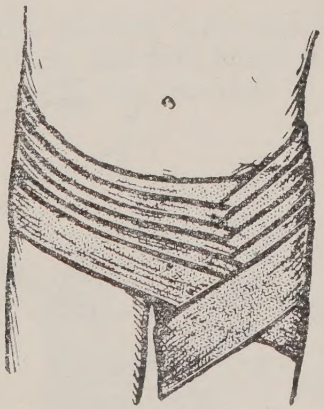

Fig. No. 28. The Descending Spica of the Groin.

12. *The Female Breast Bandage.*—Take a four inch roller bandage and apply the free end about three inches below the affected breast, and make two horizontal turns round the body to fix it.

Carry the bandage upwards from beneath the affected breast in front of the chest, over the opposite shoulder, and across the back, bringing it to the front at slightly higher level than the horizontal turns. Continue this turn, also horizontally, round the body keeping it through-

out at a higher level than the first one. On coming round to the affected breast the roll is again carried to the opposite shoulder covering half an inch more of the breast, and thence obliquely across the back until it once more joins the horizontal turn in front below the breast.

These horizontal and oblique turns are alternately repeated, each at a higher level than the preceding one until the breast is covered, the horizontal ones fixing, the oblique ones.

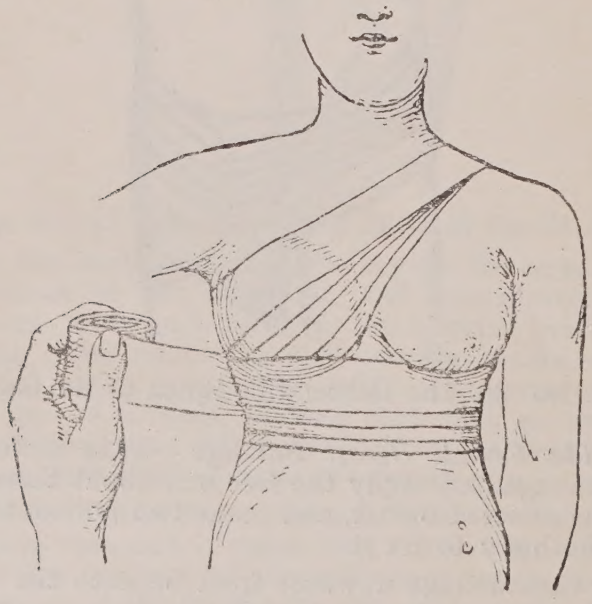

Fig. No. 29. The Female Breast Bandage.

13. *The Head Bandage.*—Three varieties of bandages are used for the head, *viz.*:—

(*a*) The Capelline Bandage.
(*b*) The Triangular Bandage.
(*c*) The Knotted Bandage.

(*a*) *The Capeine Bandage.*—Fasten two 2½ inches roller bandages together and wind off rather less than one half of one on to the other, thus making a double-headed roller with one " head " about three times as large as the other.

Stand behind the patient, who should be seated, and take the larger roll in the left hand, and the small roll in the right, and apply the bandage to the forehead im-

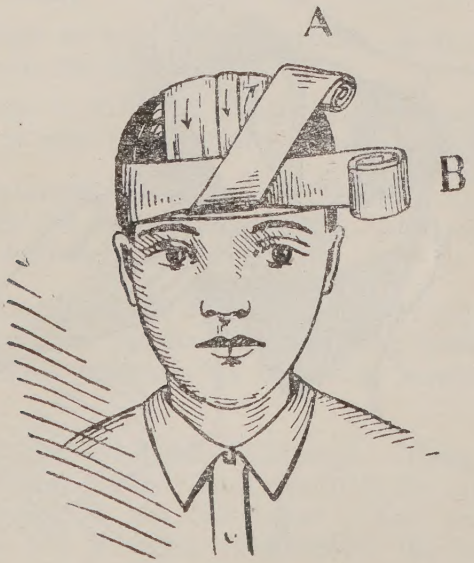

Fig. No. 30. The Capellin Bandage, front view

mediately above the eyebrows. Pass each roll horizontally backwards above the ears until the hands meet in the middle line at the back of the head, as low as practicable.

Cross the large roll over the small one. Transfer the large roll to the right hand, and the small to the left hand, and pull the bandages tight. Now carry the small roll upwards towards the middle line over the head and down to the root of the nose.

The small roll is called the "Vertical Bandage," while the large one is called the "Horizontal Bandage."

Bring the large roll, now in the right hand, horizontally forward above the right ear, making it cross and thus fix the vertical bandage at the root of the nose. Now

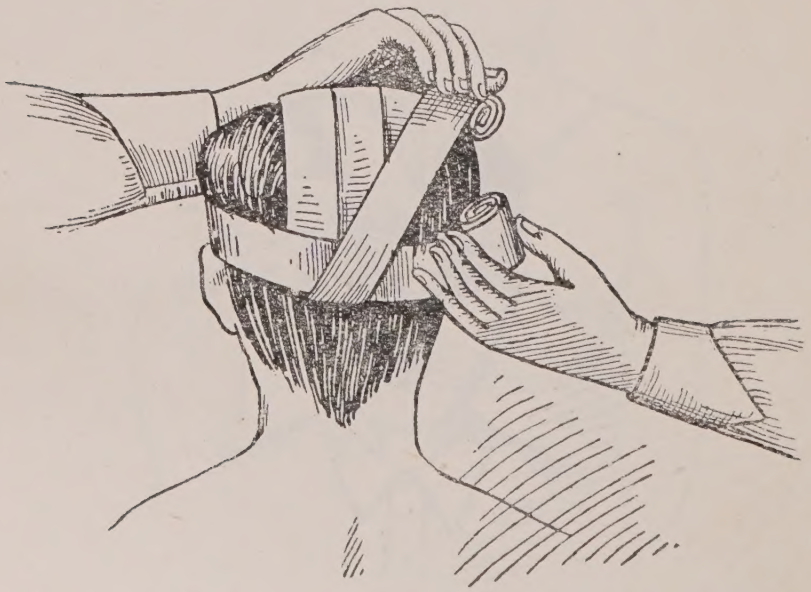

Fig. No. 31. Capelline Bandage, back view.

take the vertical bandage back over the top of the head a little to the left of the middle line, fixing it behind, as in front, by the horizontal bandage. Bring it once more to the front, this time a little to the right of the middle line, and again fix it by the horizontal bandage.

Continue carrying the vertical bandage from before backwards on the left, and from behind forward on the right, diverging each time from the middle line, until the ears are reached, when it may be cut off in front.

The horizontal bandage thus simply encircles the head to fix the vertical bandage as it passes backwards and forwards.

The whole bandage is finally secured by giving the horizontal bandage two extra turns round the head and pinning it in front.

This bandage is only detailed here, as it is given in most text books on *Home Nursing*.

The bandage is difficult to apply, unsuitable for hot climates and painful to the patient if applied too tightly.

(*b*) *The Triangular Bandage*.—This bandage is applied as described in the *Indian Manual of First Aid*, page 43, and is much preferable to (*a*).

The triangular bandage does not however exert pressure on pads sometimes applied to bleeding points on the scalp and for this purpose the following bandage is most useful.

(*c*) *The Twisted or Knotted Bandage*.—Take a bandage 2½ inches wide and 8 yards long, unroll it for about a foot, hold the free end in the left hand : place the bandage against one of the temples, then below the back of the head, and bring it back to the unrolled end. Twist this end firmly and carry it straight up round the top of the head

down the side of the face under and over the jaw to the unrolled end again, then twist it round this again, and pass it in an oblique direction, between the two preceding turns, round the head to the starting point. Make another twist and carry it round the head. Repeat the oblique and straight turns alternately till sufficient pressure is obtained, and fix the bandage by knotting the two ends together.

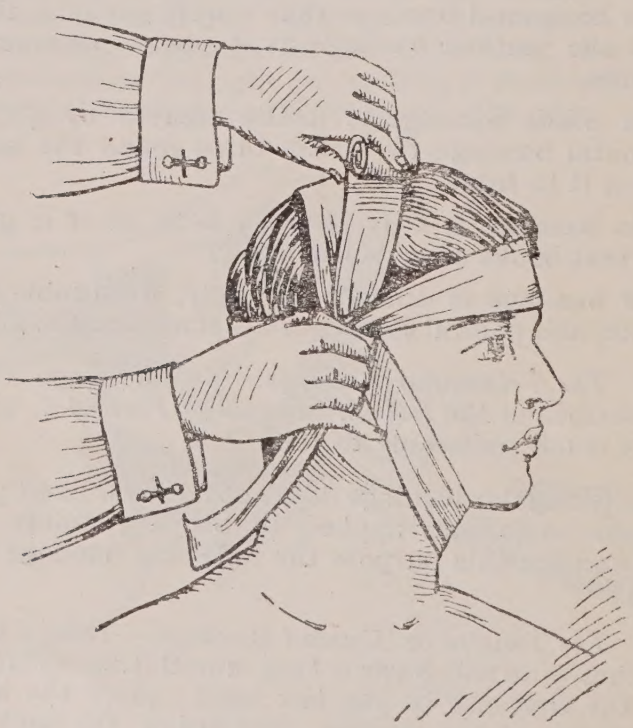

Fig. No. 32. The Twisted Bandage.

The Special Modifications of the Roller Bandages.

These are :—

(*a*) The Four-tailed bandage.
(*b*) The Many-tailed bandage.
(*c*) The T. bandage.

(*a*) *The Four-tailed Bandage.*—This has been devised for keeping dressings on the chin, back or front of the head, and on the knee.

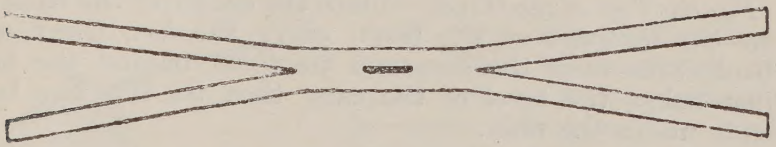

Fig. No. 33(*a*). The Four-tailed Bandage.

(*i*) *The Four-tailed Bandage for the Jaw.*—Take $1\frac{1}{2}$ yards of a three-inch roller bandage and slit down the ends to within 6 inches of the centre. Make a cut

Fig. No. 33(*b*). The Four-tailed Bandage applied.

2 inches long in the centre and place the chin in this slit. Carry the two lower ends to the top of the head and tie them there and then tie the upper ends at the back of the head. Finally tie both ends to each other behind the head.

(*ii*) *The Four-tailed Bandage for the Head.*—This consists of a piece of calico about 6 inches wide and a yard long with the ends slit to within 3 inches of the centre. It may be applied either to the top or back of the head, as follows :—

For the Top of the Head.—Place the centre of the bandage on the forepart of the head, carry the two front ends backwards over the ears and tie them behind the head just below the level of the ears, then tie the two back ends under the chin.

For the Back of the Head.—Place the centre of the bandage on the back of the head, and tie the two upper

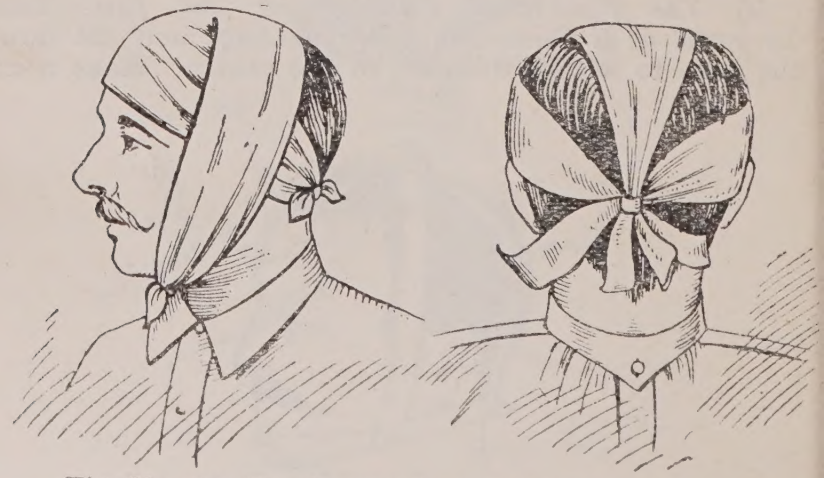

Fig. No. 34. The Four-tailed Bandage applied to top of head.

ends under the chin, and the two lower ends over the middle of the forehead.

(*iii*) *The Four-tailed Bandage for the Knee.*—Slit up a piece of calico 6 inches wide and a yard long to within two inches on each side of the centre. Lay the centre of the bandage upon the knee-cap, cross the ends behind the knee and bring them forward to the front of the joint and then tie the two upper ends above the knee-cap and the two lower ones below it.

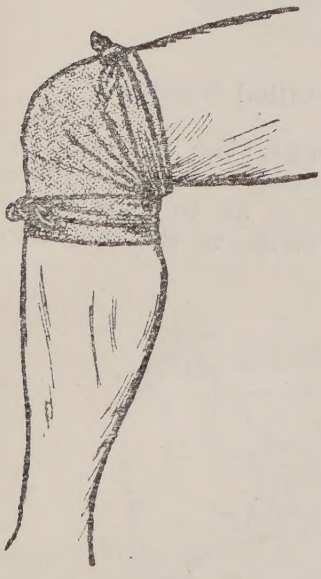

Fig. No. 35.
The Four-tailed Bandage of the Knee.

(*b*) *The Many-tailed Bandage.*—This is employed in cases where it is necessary to apply dressings to a part frequently but undesirable to move it by utilising ordinary roller bandages. It is especially useful in wounds and injuries of the chest and abdomen and is also used for burns of the limbs. The widths of the strips of bandage required are 2½ inches for the arm, and 3½ inches for the leg, abdomen or thorax. The bandage is prepared as follows:—A strip of bandage as long as the part for which it is required is spread out, and strips six inches longer than the part to be covered are laid across it, with their centres along the middle of it; these cross strips must overlap each other by about one-third and are

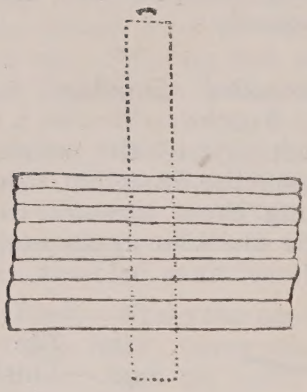

Fig. No. 36. The Many-tailed Bandage.

sewn to the straight strip. To apply the bandage to a limb, lay the limb on the central strip and fold the cross strips over from below upwards so as to overlap one another, and secure the last two strips to the two below by a few stitches or a safety pin.

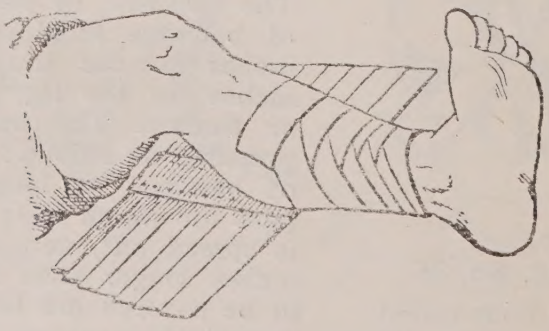

Fig. No. 37.

Application of the Many-tailed Bandage to the Leg.

(*c*) *The T. Bandage.*—This is used to retain dressings on the fork and private parts of the body and is made by taking a bandage 3 inches wide by 1½ yards long, and sewing it at right angles to the centre of a similar strip one yard long. The bandage is applied as follows :—

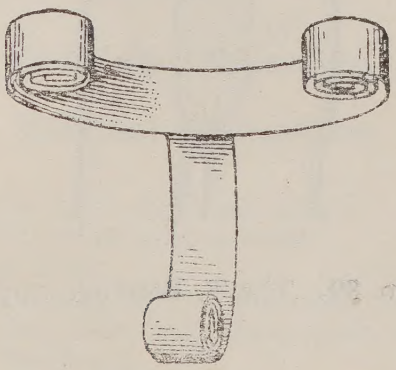

Fig. No. 38. The T. Bandage.

Pass the long strip rond the waist above the hips, and the short strip lines along the bony prominence of the rump bone and between the buttock. Fasten the ends in front and then bring the upright portion of the T. forward between the thighs and secure it to the horizontal part in front.

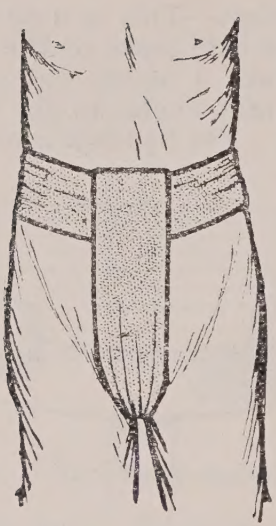

Fig. No. 39. The T. Bandage applied.

APPENDIX I.

THE HOUSEHOLD EMERGENCY CUPBOARD.

Every household should contain an emergency cupboard containing the following simple dressings, apparatus applications, and remedies :—

A. Dressings, Apparatus, and External Applications.

1. Some pieces of sterilised lint.
2. Some absorbent cotton-wool.
3. Some old linen.
4. Half a dozen roller bandages. Two half-inch, three two-inch, one three-inch, and two triangular bandages.
5. A roll of Mead's adhesive plaster.
6. Some safety-pins.
7. Ordinary thread and needles.
8. One or two surgical needles and silk thread.
9. Some oiled silk, or gutta-percha tissue.
10. A pair of scissors.
11. A nurse's dressing forceps.
12. A bottle of carbolised olive oil of the strength of one part of carbolic acid to thirty of oil.
13. A bottle of Permanganate of Potash crystals.
14. A bottle of Tincture of Iodine.
15. A smelling bottle.
16. A clinical thermometer.
17. Quinine Tablets.
18. Sweet Spirits of Nitre.

B. Medicines.

(*Internal*).

1. Dill water. (If there is a baby).
2. Compound liquorice powder.
3. Gregory's powder.
4. Fluid magnesia.
5. Soda mint tablets (for flatulent indigestion).
6. Castor Oil.
7. Sulphur.
8. Ipecacuanha or hippo wine.
9. Compound aloin tablets.
10. Cascara Sagrada tablets.
11. Lime water.
12. Citrate of Magnesia, effervescing.
13. Olive oil.
14. Bicarbonate of soda.
15. Sal volatile.
16. Liquid Paraffin.

(*External*).

1. Borax and glycerine (for sore mouth).
2. Camphorated oil.
3. Boracic powder.
4. Lanoline.
5. Boracic ointment.
6. Oil of Eucalyptus.
7. Tincture of Iodine and glycerine, equal parts (for inflamed gums).
8. Solution of Picrie Acid (1 in 160) for Burns,
9. Turpentine (for stupes).
10. Frias Balsam.
11. Hazeline.

APPENDIX II.

RECIPES FOR THE SICK ROOM.

In submitting these recipes we would remind the nurse that they are to be cooked *for*, but *not* in, the sick room.

Aluminium saucepans are much preferable to enamelled ones, as the latter quickly chip and become difficult to keep clean.

In India and the Tropics generally, the preparation of all food for invalids should be carried out under the direct supervision of the nurse.

Beef-Tea.

Take a pound of good juicy beef, cut off the top side of the round, *not* the piece of tasteless shin beef which economical khansamahs buy, cut it up finely on a board, removing all skin and fat. Place it in a jar with a pint of water and cover over tightly so that no steam can escape. Put the jar in a saucepan of boiling water and keep it on the boil for three hours. Allow to cool, skim off grease, and the tea is ready to be heated up as required. Good beef-tea should *not* be a jelly and should never be boiled.

We have found it invaluable in feeding some babies, as they often take and digest half milk and half beef-tea or chicken broth when plain milk is refused or not digested.

Beef-Juice.

Take a quarter of a pound of the best beef-steak. Remove all fat, and chop the meat up very fine, pour over it a wineglassful of water, add a little salt and allow to stand for three hours, stirring occasionally.

Strain off the juice through a piece of clean muslin and give a teaspoonful at a time. It must be prepared twice daily in hot weather, but is worth all the trouble it gives as it is an invaluable preparation for delicate children. The salts in the raw beef are generally believed to be preventatives of infantile scurvy and rickets.

Beef-Tea in Fifteen Minutes.

Scrape one pound of lean beef-steak into fibres, and after placing it in a clean saucepan pour on half a pint of boiling water ; then cover the saucepan closely, and place it by the side of the fire for ten minutes : next strain into a teacup : place this in a basin of ice-cold water and remove all fat from the surface of the liquid, first with a spoon and finally with a piece of stale bread or blotting paper ; then pour into a warm cup and heat gently to a suitable temperature for drinking.

This is the only reliable recipe for making beef-tea in a hurry *without boiling it.*

Clear Brown Soup.

Cut a shin of beef into pieces : put it into a saucepan with just enough water to cover it : when it boils skim it, and add a bundle of sweet herbs, a little turnip, carrot and celery and some pepper and salt. Let the whole boil until the meat is quite tender : then strain through muslin and allow it to stand till the next day.

Remove the scum of fat which forms on the surface very carefully and colour with burnt sugar. Beat up two eggs with their shells until they form a mass of froth and pour this into the soup, beating it up thoroughly with an egg whisk. Boil gently for ten minutes and then strain through a thin cloth.

The result will be perfectly clear soup.

Chicken Broth.

Thoroughly clean a small chicken from all fat. Chop it up, bones and all, into small pieces and add to a quart of *boiling* water in a saucepan together with a small teaspoonful of salt. Cover closely and simmer on a slow fire for two hours. Remove from the fire and allow to stand till quite cold, and then strain through a sieve. Children love a mixture of milk and chicken-broth, which is most palatable even for "grown-ups." We always recommend chicken-broth instead of beef-tea for routine use in India, as the beef is always poor, whereas chickens *if fed by the consumer* are quite as good as English ones.

Mutton Broth.

Take a pound of lean loin of mutton, free from bone and add two and a half pints of boiling water. Boil gently for two hours, adding salt according to taste. Strain into a basin and when cold skim off the fat. Warm when served. Barley, rice and vegetables may be added for elder children, but these must be *separately* and *thoroughly* boiled and not added till the broth is heated for use.

Mutton-broth if carefully prepared can be given to quite young children, but is not so useful as beef-juice or beef-tea.

Broths, soups, and beef-tea are often spoken of as "nutritious" but they really contain very little nutriment. They are, however, powerful stimulants and some very hot beef-tea is a safer stimulant for child or adult than a brandy and soda.

Veal-Broth.

Take three quarters of a pound of veal and having carefully minced it, pour upon it a pint of cold water. Let it stand for three hours; then slowly heat to the boiling point, and after boiling briskly for three minutes, strain through a fine sieve and season with salt. This is the only form in which veal should be given to children, as veal is very indigestible and not nutritious.

Blanc-Mange.

As usually prepared, this is only milk made into a thick paste with cornflour. The following, however, is a most excellent non-starchy pudding for children. Dissolve half an ounce of gelatine in half a pint of milk by means of gentle heat and flavour with any fruit essence. Whip up three ounces of castor sugar in a pint of cream and pour it into the warm solution of gelatine and milk.

Beat it up until it is stiff enough to stick to the spoon and finally pour into a mould.

Junket.

Take a pint of milk and heat it till it is at a temperature which is still cool enough to sip. Add with gentle stirring two teaspoonfuls of essence of rennet or the amount recommended for *junket* on the bottle, as different brands of essence vary in strength.

Set aside until it has firmly set and serve with nutmeg or ratiffa biscuits, with or without cream.

Junket with Egg.

A good custard may be made by adding two eggs beaten to a froth and sweetened with four teaspoonfu

of sugar to the pint of milk and then curdling with essence of pepsin (or rennet). It is well to pour this, when ready, into coffee cups, one of which will be enough to serve at a time.

White-wine Whey.

Bring a pint of fresh milk to the boil and pour in a large wineglassful of sherry.

Heat again to the boiling point but do not stir it. Put aside till the curd settles and then pour off the clear whey.

This is very highly recommended at the Rotunda Hospital, where it is said that it will stay down ; when nothing else will. Personally we have not found it superior to ordinary whey.

Whey.

Heat a pint of milk to the boiling point and add two teaspoonfuls, more or less, according to the brand of essence of rennet.

Bring to the boiling point a second time and then strain off the whey from the curd.

This is an invaluable preparation. It may be added to ordinary milk in any proportion, and in cases of sickness will be digested when all milk is promptly rejected.

Linseed-Tea.

Pour a point of boiling water over an ounce of flaxseed, and half an ounce of bruised liquorice in a teapot or jug. Cover carefully and place near, but not actually on the fire for half-an-hour to " draw " or infuse, strain and add a little treacle if desired.

This is a capital household remedy for coughs and colds in young people.

Black-currant Punch.

Add a tablespoonful of black-currant jam to a tumblerful of hot water and give to the patient when in bed. This generally induces perspiration and is therefore most useful in common colds.

Arrowroot and Black-currant Drink.

The following preparation is a useful household remedy for affections of the throat. Boil two tablespoonfuls of black-currant jam in a quart of water and strain. Mix a teaspoonful of arrowroot in cold water and pour the boiling liquor on it, stirring meanwhile. To be taken cold.

Milk Puddings.

These should not be made according to cookery book recipes for invalids. A tablespoonful of rice, and a dessertspoonful of sago or tapioca are ample for each pine of milk, as the idea is merely to present the patient with milk in a palatable form. The rice, sago, or tapioca are simply starch, and as such only desirable articles of a child's dietary in small quantities.

Imperial Drink.

Cut a lemon into thin slices and put in a jug with two teaspoonfuls of cream of tartar, two tablespoonfuls of sugar and a quart of boiling water. Keep covered and stir occasionally till cold, then strain. It is avery pleasant and cooling beverage for children and adults.

Albumen Water.

One-half pint of water.

White of one egg.

Heat about three tablespoonfuls of the water until luke-warm (not hot), and pour it gradually into the white of the egg which has been placed in a bowl, beating all the time with a fork. Now add the remainder of the water and strain through a coarse sieve. Put at once into a cold place if not required immediately.

Oatmeal Water.

Take one cup of fine oatmeal, and two quarts of water which has been boiled and cooled. Add the oatmeal to the water and keep it in a warm place (a temperature of 1890 Fahrenheit) for one and a half hours : strain and cool.

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